

# AMERICAN RAILROAD JOURNAL, AND ADVOCATE OF INTERNAL IMPROVEMENTS.

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## AMERICAN RAILROAD JOURNAL, &c.

NEW-YORK, DECEMBER 14 1833.

RAILROAD JOURNAL.—Subscribers to the Railroad Journal will please bear in mind that the next, or *twenty-first* number, will not be issued in its regular order, as I am desirous of showing them the work in a *semi-monthly* form, with a cover of colored paper, by which means it can be more readily preserved than in loose sheets. The 51st and 52d numbers, together with an *index and title page*, will be issued on the 27th inst., stitched in a cover, and forwarded to subscribers as usual.

Having heretofore expressed some doubts of the *continuance* of the Railroad Journal, for want of patronage to *pay its expenses* for materials and labor, I now have the pleasure of informing those who take an interest in its continuance and success, that it *will be continued*, at least another year.

I have received from a great number of its friends positive assurances of their best exertions to promote its circulation, as well as the continuance of their own support, and, from many others, assurances in the most substantial form, to wit—by subscribing for one or more *additional* sets from its commencement, with *payment in advance for the ensuing year*, thus inducing me to believe that its continuance is considered worth an effort, and at the same time, if all its *present* subscribers shall continue and pay promptly for the ensuing volume, enabling me to continue it in its *present shape and size*.

I now, therefore, repeat that the RAILROAD JOURNAL will be continued. It is necessary, however, for me to say, that payment will be expected in advance, or by the 1st of February—as that, and that only, will enable me to send it to subscribers with

such improvements as I hope to be able to make in its appearance.

Those who find it inconvenient to remit *three* dollars for want of small bills, will be credited with the *full* amount, if they remit *five* dollars in advance for the Journal, *subject to postage*.

*\*\** Those subscribers *now* indebted for *past* volumes, who do not pay by the first of February, will be charged four dollars per annum.

It is hoped, however, that no person friendly to the Journal, or the cause it advocates, will at that time be in debt to it, as my intention is to publish only enough to supply those who pay for it, and a few surplus copies for binding.

Hereafter the subscriber will be charged with the amount of postage paid by me, unless the letter contains *five* dollars or over; and letters ordering a change of direction of a paper, will not be attended to, if they come subject to postage. This measure is adopted, not from a desire to be uncourteous, but to avoid a repetition of what has frequently occurred, probably from thoughtlessness, to wit, having to pay 18 3-4 or 25 cents for the privilege of stopping a Journal in one place and sending it to another; and it has occurred, too, in more than one instance, where the subscriber had not paid his subscription. It will not be so hereafter. If the Journal is worth having, it is worth *paying* for; and if it is a convenience to have its direction changed from one place to another, that convenience is worth the postage of a letter.

Those who hereafter subscribe for the Journal, and wish the back volumes also, can have vols. 1 and 2 in two parts to each volume, with title-page and index to each, stitched in covers of colored paper, which can be forwarded by mail, to any part of the country. Price of the *three* volumes, the two first in covers, and the third as it shall be published, \$10 in advance. Remittances by mail, if enclosed in presence of the postmaster, will be at my risk.

BALTIMORE AND OHIO RAILROAD.—In this number will be found the conclusion of the 7th Annual Report of the President to the Directors of the Baltimore and Ohio Railroad Company. That of the Chief Engineer will follow. A detailed statement of the surveys and estimates for the Baltimore and Washington Railroad is given, which will be found to contain much useful information; or, at least, we believe so, and therefore shall make copious extracts from it hereafter.

UNDULATING RAILWAYS.—In the Journal of

the 30th of November will be found an account of Mr. Badnall's *first* experiment, made on the Liverpool and Manchester Railroad, to test his theory of the *undulating* railway. As this is a subject of much importance to railroad companies, as well as one about which much has been said in the Journal, we are gratified with the opportunity of laying before them an account, which will be found at page 769 of his further experiments upon the same road, which have, apparently, fully established the correctness of his theory. We shall endeavor to obtain further information from authentic sources upon the same subject.

We are informed by a letter from a gentleman at York, Upper Canada, that an application for a railroad between Lake Ontario and Lake Erie is now before the legislature of Upper Canada.

SUSPENSION RAILWAY.—We have been asked for a more definite description of the *suspension* railway than has hitherto been given to the public: in reply to which we would observe that a friend, residing in Boston, has promised us a full description, with drawings, which we shall certainly give to our readers at the earliest possible period.

LONG ISLAND RAILROAD COMPANY.—We publish in a following column the proceedings of the convention held at Smithtown on the 3d inst. We are gratified to perceive that the proposed road is exciting much interest in its favor, not only throughout the island, but in New-York. So strongly is the public mind impressed with a belief of the ultimate success of this work, that we are assured the whole amount of the stock would be taken up without the least delay.—[Long Island Farmer.]

LOCOMOTIVE ENGINES ON COMMON ROADS.—Mr. Byington, an ingenious mechanic of Pittsburgh, is engaged in the construction of a locomotive steam engine, on an improved plan, and intended to be used on common or turnpike roads. The Pittsburgh Statesman says, Mr. B. is confident that he has discovered an improvement by which a locomotive engine may be made to operate on such roads with perfect success. Let us hope that this confidence on the part of the builder is not premature or ill founded. If experience shall justify it, and he succeed in his undertaking, he will prove himself one of the benefactors of the age.—[Baltimore Patriot.]



*Seventh Annual Report of the President and Directors to the Stockholders of the Baltimore and Ohio Railroad Company.*

(Continued from page 772.)

**2. The Construction of the Lateral Road to Washington.**—At an early period in the existence of the Company, the expediency of a lateral railroad to Washington, in connection with the Baltimore and Ohio Railroad, was suggested and universally admitted. Eight miles of the distance, or one-fifth, and that certainly the most difficult of construction, had already been made in the prosecution of the main stem towards the Ohio, and a level obtained, at the crossing of the Patapsco, which would materially diminish the expense of passing the dividing ridge between the waters of that river and the Patuxent. The arrangements too, in the streets of the city of Baltimore, which were prepared for the accommodation of the main stem, would be equally available for the lateral road; and the experience already obtained by the officers of the Company, would secure the completion of the work upon the best terms, and in the cheapest manner. These reasons pointed to the Baltimore and Ohio Railroad Company, as the proper body to construct the Railroad to Washington, and the profit which it was conceded, on all sides, would result from the work, when completed, induced the Company to undertake it. Application was accordingly made to the Legislature, at December session, 1830, for pecuniary aid, by a subscription to the stock of the Baltimore and Ohio Railroad Company. The subscription was not made, at the time, but the right to make it was reserved by the State. Although the law that was passed on the subject was by no means acceptable, the Company continued the surveys for the road, and obtained an act of Congress authorizing its construction within the District of Columbia. At the session of 1831, of the State legislature, the application of the preceding year was renewed, and the law was modified in many important particulars, but still the option to subscribe to the stock was left to the state, and the uncertainty whether this would be exercised or not, made the law of 1831 but little more acceptable or efficient than that of 1830. The surveys, however, were still continued, the nature of the country between Baltimore and Washington being found to be such as to require very extensive examination, and the most careful comparisons of the various practicable routes, previous to the adoption of any line between the two places.

At the last session of the Legislature, the application of the Company for assistance to construct the Washington road was again made, and with a success that authorised the commencement of the work without further delay. The fare for carrying a person the whole distance between Baltimore and Washington was raised from \$1 50, the price in the two preceding laws, to \$2 50, subject to such reduction as expediency might require. The state took \$500,000 of the stock, upon condition that \$1,000,000 should be bona fide subscribed by others, and providing that the whole \$1,500,000 should be a separate stock; the Railroad Company to pay to the state, as a bonus, one-fifth of its annual receipts from the conveyance of passengers, besides its proportion of dividends on the stock held by it. Authority was given to the Railroad Company to subscribe to such portion of the stock as might not be taken at the end of thirty days after opening the books, to borrow money to pay the instalments on their stock, and "to pledge the property and funds of the Baltimore and Ohio Railroad Company, with the consent of a majority of the stockholders, in general meeting called for that purpose, and so much of the stock made a separate stock as might be subscribed by the Baltimore and Ohio Railroad Company, as a security for the payment of any and every sum so borrowed, and the interest thereon, provided that the property of the state

in said road should, in no event, constitute any part of the pledge above mentioned." Authority was also given to the city of Baltimore, and the Company owning the turnpike road between Washington and Baltimore, to subscribe for a certain amount, if they thought proper, at any time within six months after the passage of the law. The books being opened, stock to the amount of \$61,200 was taken by individuals; but the city of Baltimore, and the Turnpike Company, not having subscribed, the question at once arose, whether the road should be abandoned, or the Baltimore and Ohio Railroad Company should take the unsubscribed stock, under the authority granted to them by the act of assembly. To determine this, a meeting of the stockholders was called, upon the 8th day of May, 1833, at which it was determined, by a vote of 25,454 shares to 820 shares, to take the stock, and to make the pledge authorised by the law for the payment of the principal of the sums borrowed for the purpose, and the interest thereon. In consequence of this determination, the board took immediate measures to commence the lateral road, and have effected such pecuniary arrangements with the Union Bank of Maryland as will secure the successful prosecution of the design. The surveys have been completed, and after a most careful and minute examination of the various lines run, the board have adopted a route as far as to the District of Columbia, presenting in no case an elevation of more than 20 feet to the mile, or a curvature of a less radius than 1273 feet, the average radius being about one mile. The bridge over the Patapsco, at the Hockley mills, has been under contract since the beginning of July, and is rapidly progressing; the contractors have also commenced operations on the first division of the road, extending from this bridge to the summit of Merrill's ridge.

The remainder of the road will, in a short time, be let, and the graduation of the whole distance will be prosecuted simultaneously, so as to be completed at the same time with the bridge over the Patapsco. The board feel satisfaction in announcing to the stockholders that the proprietors of the land over which the road will pass, have, very generally, either ceded the right of way gratuitously, or agreed to refer the subject to amicable arbitration, so that a pregnant source of expense and litigation will in a great degree be avoided.

With the prospect of profit to the stockholders, on the completion of the lateral road, the board have every reason to be satisfied, from the two additional sources of revenue that will then be open. The one, the use of eight miles of the present road for a transportation, which it would otherwise never possess—the other, the dividends on the amount of stock held by the company, as an independent corporation, in the undertaking.

With regard to the resources of the company to meet the interest on the loans made for the lateral road, and the course which has been adopted in relation to it, the board refer to the report of a committee of their body, dated July 12th, heretofore published, and now inserted in the appendix.

**3. The Perfection of Steam Power for the Purposes of Transportation, together with the Subject of Machinery generally.**—In the Sixth Annual Report, the board of directors announced the satisfactory result of the improvements that had been made with the engine of Davis & Gartner, constructed with Cooper's vertical boiler—many further experiments, however, were necessary, and much remained to be done, before the board could feel themselves authorised to order engines upon this plan. The first engine was necessarily an experiment. The exact proportion of the parts could only be determined by constant use—and for some time after the engine commenced running, frequent alterations were found to be necessary to obtain the strength, lightness and

compactness, united with general efficiency essential to the success of the machine. This, however, has been finally accomplished, and the board feel satisfied that they have obtained, by the perseverance of those in their employment, an engine better adapted to the purposes of this road than any other yet invented. The engine in question is as manageable as the best English engines, possesses much more power with the same weight, works with equal, or very nearly equal, facility, on a curved and straight road, presents all its parts to the eye of the engineer as he occupies his stand, burns the anthracite coal with great facility and powerful effect, and evaporates more water in a given time, and is liable to far less injury from wear and tear, than any other known engine. The objection against the English engine of the present construction, is, that the tubes of its horizontal boiler are frequently bursting, by which not only is the expense of repairs incurred, but the bursting of a tube at once extinguishes the fire, leaving sometimes the engine and its train in the middle of their journey. In the vertical boiler used by this company, and the right to use which they have purchased from the ingenious inventor, Peter Cooper, Esq. all this is entirely avoided. In the horizontal boiler, the fire is at one end, where of course the greatest quantity of steam is produced, and the density of the water is the least; so that the tubes, where most exposed to the action of the heat, are least protected from it; and the fact is, that the tubes commonly all burst within a few weeks. Various attempts have been made to remedy this by producing a circulation in the water of the boiler, but hitherto it is believed without success. In the vertical boiler, on the contrary, the water on the outside being colder than that which is near to the tubes, descends towards the fire and passes up again in bubbles of steam to the steam chamber, to exert its expansive power in pressing the water of the boiler downwards to the very place where the intense heat of the anthracite coal renders every protection necessary which can be afforded to the bottom of the boiler, and to the tubes. In the upright boiler, therefore, without the intervention of complicated machinery to obtain a circulation, it is produced in the most efficient manner, by simple and natural causes. Some idea may be formed of the value of the vertical boiler, adopted by the board, from the fact, that after twelve months use, with anthracite coal for fuel, not one of the tubes of the Atlantic engine has given way, and to all appearance they are now as sound as when first put in. For a further account of the performance and power of this engine, see report of the Chief Engineer, and of the Superintendent of Machinery.

The "Traveller" Engine, which was first put upon the road on the 10th of October, and which, like the Atlantic, has a vertical boiler, fully answers all the anticipations that were entertained of its performance, mentioned in the report of the Chief Engineer. The attaching of the pinion, through which the power is communicated to the wheels, to a separate shaft, has fully answered the purpose of giving steadiness to the machinery, and will no doubt very materially diminish its wear and tear. The "Traveller" is an excellent illustration of the propriety of devoting every attention to the vertical boiler engine, and exhibits numerous points of superior excellence over its predecessor, the Atlantic. When it is considered that the horizontal boiler engine, of England, has been brought to its present excellence, after the experience and experiments afforded by its constant use for a long time; and that it is, as may be safely said, inferior in point of durability, and power to generate steam, to the first attempts with vertical boilers, it is not unreasonable to believe that the latter will supercede all others, and every effort will forthwith be made to put a competent number upon the road.

Besides the improvements in the locomotive engine, others have been made in the machine-



ty used by the company, and particularly in the construction of the wheels of the cars—by which an iron rod is introduced into the rim of the wheel when cast, which not only adds to the hardness of the outer surface, by perfecting the chill, but increases in a great degree the safety of the wheel itself. Improvements have also been made in the burthen cars, tending materially to diminish the wear and tear of them; and with a view to the employment of steam, the passenger cars will hereafter be so constructed as to carry neither passengers nor baggage upon the top—by which a very great saving in the first cost of them will be effected, and the chief cause of injury to them will be avoided. At the same time every attention will be paid in the construction of the cars, to render them, both in winter and summer, comfortable to those that use them. For a more full detail of this department, reference is made to the report of the Chief Engineer, and of the Superintendent of Machinery.

The company having thus, by a series of experiments and gradual improvement in the various machinery and motive power, arrived at a state of information sufficient to become the manufacturers of their own engines, and the board having hitherto been unable to enter into satisfactory contracts for them, they determined to erect upon their own grounds suitable buildings, and provide the requisite means to construct all that they may require, as well as to keep them in a state of repair. By this course, the board have no doubt that a considerable reduction will be effected in the cost of the machinery and moving power.

The board of directors have now gone over those subjects which, at the commencement of the official year, claimed their particular attention; and upon a review of the events of the last twelve months, although they still find themselves pressed by many difficulties, yet they also find much cause for congratulation. A dispute with the Chesapeake and Ohio Canal Company, which, after the decision of the courts, threatened serious injury to this company, has been amicably and happily settled, and a good feeling exists between the two corporations, which, as their interests will hereafter be closely connected, by the extensive advantages they will reciprocally confer upon each other, it is hoped and believed that nothing will occur to disturb. The way to the west through the Valley of Virginia is now open to this company. The Conococheague offers an easy access far into the interior of Pennsylvania; and the Potomac, when circumstances will admit, is still open as one of the avenues of western intercourse. The construction of the lateral railroad to Washington is secured, together with the advantages that must, in a pecuniary point of view, accrue to the company, from that work, when it becomes the channel of communication, not only between Baltimore and Washington, but between Baltimore and the Chesapeake and Ohio canal, and the country on the borders of the lower Potomac: at the same time improvement has advanced with a steady pace in every department of the company, and upon reference to the report of the Superintendent of Transportation, it will be perceived that there has been a steady and satisfactory augmentation in the revenue of the company, accompanied by a comparatively small increase in the expenses of transportation. In fine, the board of directors see nothing now which can possibly interfere with the early completion of the work, to points where it is believed that every reasonable anticipation of profit and advantage, both to the stockholders and the public, will be fully realized.

For a statement of the receipts and expenditures of the Company during the past year, and for an exhibit of its general fiscal concerns, the board refer to the report of the Treasurer.

On behalf of the Board,

P. E. THOMAS, President.

October 7, 1833.

*An Investigation of a Formula for calculating the Transfer of Water from one Level to another, by the Lockage of Boats in Canals.* By S. C. WALKER. [From the Journal of the Franklin Institute.]

The natural tendency of fluids towards a level, or state of equilibrium, renders it easy to transfer water from the summit level to the lowest level, by the simple opening of gates. When there is a scarcity of water in the summit level, the deficiency may be supplied by stationary steam engines, and the loss from evaporation, leakage, and other causes provided for. It is an inquiry of importance whether there may not sometimes be in the circumstances of the country through which canals pass, natural means, of which advantage can be taken to effect a transference of water from the lowest to the summit level. Should such means present themselves, the expediency of using them to effect this transfer, in any proposed canal, would be determined by an estimate of the expense of locks adapted to the purpose, of the time lost by lockage, and the value of the water thus raised to the summit level, or omitted to be drained away.

With these statistics, the present inquiry has no concern, its object being to ascertain whether such transference is possible in any instance, and if so, in what instances, and under what circumstances it is possible.

Make  $l'$  = the length, in feet, in the clear of a lock.

$l''$  = the average length, in feet, of a boat.

$w'$  = the width, in feet, in the clear of a lock.

$w''$  = the average width, in feet, of a boat.

$d'$  = the difference, in feet, of the levels above and below the lock.

$d''$  = the average depth, in feet, of the water displaced by the boat going from the upper to the lower level.

$d'''$  = the same for the boat returning from the lower to the upper level.

$m$  = the factor by which a cubic foot of water must be multiplied to obtain its weight in parts of a ton, avoirdupois.

Then  $m l' w' d'$  = the tons of water required to raise the water in the lock from lower to upper level.

$m l'' w'' d''$  = the tonnage of the boat descending.

$m l'' w'' d'''$  = the tonnage of the boat ascending.

In canals where there are no lateral reservoirs,

$m l' w' d'$  = the constant loss of water transferred from upper to lower level by locking a boat in either direction.

$m l'' w'' d''$  = the tons of water transferred upwards by the descending boat, by virtue of the fixed gates used as fulcra. These tons are first transferred above the upper gates by admission of the boat into the lock, by virtue of the fixedness of the lower gates; the contrary supposition involving the absurdity of maintaining that the lock receives the addition of  $m l'' w'' d''$  tons without raising the level. The same amount  $m l'' w'' d''$  tons is again transferred from the lower level into the lock, by the removal of the boat below the lower gates, by virtue of the fixedness of the upper gates. The contrary supposition involves the absurdity of maintaining that one horse can by his single strength elevate a number of tons,  $m l'' w'' d''$ , through a height  $d''$  without any mechanical advantage.

The same reasoning may be applied to the ascending boat.

$m l' w' d'$  = the tons transferred from the lock to the lower level by admission of the ascending boat, by virtue of the fixedness of the upper gates, and again transferred from the upper level to the lock by removal of the boat upwards, by virtue of the fixedness of the lower gates.

The contrary hypothesis involving similar absurdities.

It will now be easy to deduce a formula for expressing the transfer of water by the two operations of locking a boat downwards and upwards, whatever be the load of the boat in either direction.

Make  $T$  = the number of tons thus transferred from one level to the other by this double operation, the positive value being upwards from lower to upper level, the negative value downwards from upper to lower level.

$$T = m(l'w'd' - l''w''d'' - 2l'w'd') \dots (1)$$

$$= m\{l'w'(d' - d'') - 2l'w'd'\} \dots (2)$$

Make  $p$  = the factor by which  $l'$  must be multiplied to equal  $l''$ .

$g$  = similar factor for  $w''$  to produce  $w'$ .

$$\text{Then } p l' = l''$$

$$g w'' = w'$$

Substituting the values of  $l'$  and  $w'$  in (2)

$$T = m\{l''w''(d' - d'') - 2pql''w''d'\}$$

$$= m l'' w'' (d' - d'' - 2p q d') \dots (3)$$

In this formula the conditions to be fulfilled in order that  $T$  may be positive, in other words that there be a net transfer from the lower to the upper level, is that  $d' > (d'' + 2p q d')$ . This is manifestly possible; for by constructing the boat to fit closely to the sides and end of the lock,  $2p q$  may be diminished at pleasure, and  $d'$  may be taken of any amount, however small. In practice the natural limit to the smallness of  $d'$  depends upon the cost of locks and the value of time lost in lockage through a multiplicity of locks;  $d''$  may be the depth of water displaced by an empty boat,  $d'$  by a loaded boat; in such an instance the above conditions may be verified, even without lateral reservoirs for diminishing the loss from difference of level.

The same formula will readily enable us to calculate the transfer of water in those canals whose locks are provided with lateral reservoirs.

Make  $a$  = the factor by which the loss  $2m p q l'' w'' d'$  must be multiplied in order to be equal to the diminished loss caused by the use of lateral reservoirs. Then we have

$$T = m l'' w'' (d' - d'' - 2a p q d') \dots (4)$$

Where the condition of a net gain being made by transference from the lower to the upper level is  $d' > (d'' + 2a p q d')$ .

I am indebted to Mr. Millington of this city for information that a reward of £500 was offered for the invention of a method by which, without any foreign moving force, the loss from lockage in the Regent's canal, London, might be reduced to 0. Such a reduction appears to be impossible in that canal, from the circumstance that the annual average is  $d' < d''$ , and therefore, for a stronger reason, is  $d' < (d'' + 2a p q d')$ .

The value of the factor  $a$  in the canal is  $\frac{1}{10}$ , and the loss from difference of level is diminished by lateral reservoirs to  $\frac{1}{10}$  of that which would otherwise be made.

The formula (4) has been prepared for one lock with two gates, it is obvious that the same holds true of each of the locks of a canal. It is general, and embraces all the varieties of locks.

Make  $D''$  = the annual average of depth of water displaced by descending boat.

$D''$  = that by ascending boat.

$n$  = the number of passages of boats from summit level to lowest level and back, then, if all the locks are constructed alike,

Make  $A$  = the annual amount transferred from one level to the other, positive value upwards.

$$A = m n l'' w'' (D'' - D' - 2a p q d') \dots (5)$$

Where the condition of positive gain is  $D'' > (D' + 2a p q d')$ .

The same formula will enable us to determine in any proposed canal where  $D'$  is much greater than  $D''$ , the smallest number of locks



with which a given difference of level  $\Delta$  may be overcome consistent with the above condition, viz. that there shall be an annual gain of water transferred from the lowest to the summit level. In this case

$$n d' = \Delta \text{ and } n = \frac{\Delta}{d'}. \text{ Putting } \frac{\Delta}{d'} \text{ for } n \text{ in } \dots (5)$$

$$A = m \frac{\Delta}{d'} w'' (D'' - D''' - 2 a p q d') \dots (6)$$

From which  $n$  disappears and the condition remains as before

$$D'' > (D''' + 2 a p q d')$$

Transferring  $D'''$  to the other side of the inequality, we have

$$(D'' - D''') > 2 a p q d' \dots (7)$$

Dividing this inequality (7)

$$\frac{D'' - D'''}{2 a p q} > d' \dots (8)$$

For  $d'$  put its value  $\frac{\Delta}{n}$

$$\frac{D'' - D'''}{2 a p q} > \frac{\Delta}{n} \dots (9)$$

From the inequality (9) it appears that the smallest integer value of  $n$  admissible under the above condition, is such that the quotient arising from the division of  $\Delta$  by it, must be less than the numerical value of the expression  $\frac{D'' - D'''}{2 a p q}$ , when  $a = \frac{1}{20}$  as in the Regent's canal, the inequality (9) becomes

$$\frac{10 (D'' - D''')}{p q} > \frac{\Delta}{n} \dots (10)$$

In the Schuylkill we have  $D'' > D'''$ , because the amount of descending tonnage of anthracite coal far exceeds the amount of ascending tonnage. It is therefore manifest that the condition (8), or (9), as well as (10), is possible in this canal. It is not my object to inquire at present concerning the amount of ascending and descending tonnage, a reference to the statistics of this canal would furnish any one with the means of assigning the value to the first member of these inequalities, and thence to deduce the number of locks required, and the descent of each, subject to the condition that the annual result of lockage on that canal should be a transference of a certain number of tons of water from the tide water of the Schuylkill river to the summit level of the Schuylkill canal.

The above demonstration rests upon the principle of equivalence of action and reaction. In the motion of cars or carriages on roads, or railroads, this reaction is not perceptible; the theory of gravitation shows that it exists; let  $m$  = the mass transferred on a road; let  $n$  = the number of miles on the arc of the earth's circumference through which the car moves; then  $m n$  = the momentum in this arc of rotation round the earth's axis thus effected by using successive points of this circumference as fixed fulera; then it is evident that there exists an equivalent motion in the contrary direction of the same arc. This cannot take place among the particles at the earth's surface; accordingly, a motion of the earth's mass takes place, which, resolved in the same arc, is equivalent and contrary. In the motion of boats this reaction takes place immediately and perceptibly by virtue of the same law. If a number of tons of coal be transported on the banks of the Schuylkill canal, an equivalent contrary motion of the earth's mass takes place unperceived; but if the same number of tons of coal be transported in the canal through the same space, then an equal number of tons of water are transferred by reaction through the same space in a contrary direction.

My only aim in the above communication has been to demonstrate a principle first applied to canals by Dr. Dewees, of Pottsville, Pennsylvania, Journal Franklin Institute, vol. xi. p. 111.

Philadelphia, August 21st, 1833.

**NEW-YORK AND ERIE RAILROAD.**—At a Convention of Delegates from the counties west of Broome, held in the village of Angelica, on the 4th December, on the subject of the New-York and Erie Railroad, the Hon. John Magee, from Steuben, was called to the chair, and Austin Smith, Esq., of Chautauque, and Lewis Skorke, Esq., of Allegany, were appointed Secretaries.

After the Convention was organized, Anson Gibbs, Esq., of Cattaraugus, stated the object of the meeting, and reported the proceedings of the Convention held in the city of New-York on the 20th ult.

A letter from the President of the Company was then read by Lewis Skorke, Esq. and some appropriate remarks made, whereupon it was

“Resolved, That a committee of seven be appointed to draft resolutions expressive of the sense of this meeting, and that Benj. F. Smead, Anson Gibbs, Lewis Skorke, Andrew C. Hull, John B. Church, William Goff, and Austin Smith, Esqs. constitute said committee.”

The committee having retired for a short time, returned with the following resolutions, which were unanimously adopted:

Resolved, That we highly approve of the vigorous and energetic measures taken by the citizens of the city of New-York, in furthering the construction of the New-York and Erie Railroad; and that we will use our greatest exertions to promote an object of such high importance to the southern tier of counties.

Resolved, That the enlightened and liberal views of the inhabitants of the southern tier of counties, manifested by the readiness with which they have already contributed donations to the Company, meet with our most cordial approbation and encourages us to hope that the work so propitiously commenced, will be vigorously prosecuted; and that a sum sufficient to meet, in a great measure, the loss of interest on the capital expended during the construction of the railroad, will be subscribed by the inhabitants along the route. To forward this object, we recommend to all the county and town committees appointed for that purpose, to make the most indefatigable exertions to procure as great an amount of subscriptions as possible, and forward a statement of the same to the President of the Company, early enough to arrive in New-York on the 25th inst., that the Company may be enabled in their application to the Legislature for a subscription to the stock, to present the amount of the donations as an argument of the earnestness and zeal with which so large a portion of the state embarks in the project.

Resolved, That we deem it an object of great importance, that the inhabitants on the proposed route lay aside all sectional feelings in their donations, and adopt that form of subscription which is recommended by the agent of the company, untrammelled by conditions which would be calculated to render their bonds unavailable.

Resolved, That the vast influx of emigration into the southern portion of this state, together with the increased wealth, enterprise, and intelligence, which are its necessary accompaniments, furnish proof of an unequivocal character, that at the earliest period of the completion of the New-York and Erie Railroad, the business and resources which will flow into its channel, will be more than adequate to its capacity, without the least infringement upon the great northern canal or its lateral branches; and that the early opening and late closing of the annual operations of this railroad will have a most important tendency to secure from foreign and rival channels a great portion of the immense western trade, now actually tending to the northern and southern markets.

Resolved, That each county through which the contemplated railroad shall pass, be solicited to send one or more suitable persons to attend the Legislature, for the purpose of ob-

taining a subscription to the stock of the Company by the State.

Resolved, That the proceedings of this convention be signed by the chairman and secretaries, and published in the several papers in the section of country through which the proposed railway shall pass, and also in the Railroad Journal, published in the city of New-York.

JOHN MAGEE, Chairman.

AUSTIN SMITH, } Secretaries.  
LEWIS SKORKE, }

*On the Termination of the Stonington and Providence Railroad.* By D. To the Editor of the American Railroad Journal, and Advocate of Internal Improvements.

PROVIDENCE, R. I., Nov. 6, 1833.

SIR—I have just observed the very disinterested statement of your correspondent, “More Hereafter,” regarding the termination of the Stonington and Providence Railroad, and I cannot help congratulating the Pawtucket Road Corporation on the sagacity they have displayed in their choice of a counsel. When the parties concerned in the location of a road are anxious to obtain the line which shall really best fulfil the intentions and interests of their company as a body, they have generally left the preliminaries to their Engineers, who, not being otherwise than professionally interested, are not likely to be biased by individual assertions, but as far as their judgment admits, may be presumed likely to select the most advisable route for all parties or at least to furnish the Boards of Committee with information which will very much facilitate a correct conclusion. This, however, can only result when confidence is placed in the members of the engineer corps, and not where it is expected that they shall be controlled or directed, or encumbered, with the gratuitous advice of individuals on the *qui vive* for a speculation—or of a small company, who, under the pretence of the most disinterested patriotism, or the most angelic benevolence, would persuade their townsmen that that route, and that route only, is possible, or tolerable, or expedient, which shall come within the limits of their charter, and thereby enable them to realize a tolerable return by their job, in the assembly. These men profess to have a most brotherly love for all good citizens who may chance to travel in their neighborhood, a most accommodating affection for the different corporations with which they come in contact, an especial watch over the interests of their fellow-citizens, an entire confidence in the committees appointed for the sole purpose of considering the termination spoken of, and with whose deliberations they profess not to meddle. Yet the route they advocate admits of no dispute—it is certainly the most feasible, the most reasonable, the most expedient route; it is the route indeed for which they hold a charter. Ah! I can discern the cloven foot peeping out.

I pretend not in the present stage of the business to say what route may be most advisable, as it is not improbable the best as regards line may not be. The subject is not matured; sufficient data are not collected; the opinions of those to whom it has been entrusted, are not received, and cannot therefore be commented on. It would be impertinent, not to say unreasonable, to offer any remarks under these circumstances, as much as before the progress of a trial where it is not desired to bias the judgment of the Bench. Those who really desire to see the best location adopted, will wait in silence; those who have a sinister purpose to serve, will doubtless contrive to fly their paper kites as usual. Yours, most respectfully,

D.



**MR. BURDEN'S STEAMBOAT.**—Yesterday, December 13, this raft, (for at present it is nothing else,) made an excursion up the North River as far as Yonkers, between 20 and 21 miles from the foot of Courtland street. In its passage out, in consequence of some parts of the machinery being disarranged, no attempt was made to obtain a greater speed than ordinary steamboats. When at Yonkers, all was ready to put the principle of the movement to the test, and the result was, that in one hour and one minute we arrived at Courtland street. An esteemed correspondent who has had frequent opportunity of witnessing the construction of this boat, has forwarded a description of its formation, and of its probable utility. This description has been submitted to Mr. Burden, who, after making some trivial alterations, has stated that he has no objection that it should be made public—that he considers it a correct one: it is, therefore, subjoined. In our next we shall give a correct view of the boat, as it can now be seen at the foot of Beech street; and also several diagrams illustrating the construction of its various parts, accompanied with as detailed a description as can be gathered in its present imperfect state. It is evident that it is capable of performing all that its inventor has promised, and its importance to navigation cannot but be obvious to every one. On canals it will be particularly useful, for unlike other steamboats, it causes no swell, which has hitherto been the great objection against introducing steamboats on our canals.

**Mr. Burden's Improved Steamboat.** By S. BLYDENBURGH. To the Editor of the American Railroad Journal, and Advocate of Internal Improvements.

LANSINGBURGH, Dec. 7, 1833.

SIR—Your favor of November 12th was handed me about three days since. With respect to Mr. Burden's boat, I received the letter too late to do justice to the subject. The boat lay three miles below Lansingburgh, and the travelling exceedingly bad. I went down yesterday to take the sketch you requested, but before I got there the boat had started and I missed her altogether. This morning she has started for New-York, and you will have an opportunity to get the sketch there.

The great simplicity of the plan of Mr. Burden's boat renders it one of those most useful of all inventions, which make every ingenious man wonder why he never thought of it before. But as I have not the honor of an acquaintance with Mr. B. I can only give you such superficial outlines as I have gathered from observation in passing it, merely to satisfy my own curiosity.

The principle on which the invention is founded consists in placing two hollow parabolic spindles parallel to each other, at sufficient distance to admit a wheel between them, and by connecting them together by strong timbers across the top, both before and aft the wheel, in such manner as not only to give the necessary strength, but also to serve as a foundation whereon to erect the necessary superstructure both for the machinery and for the accommodation of passengers.

In his present boat the spindles or trunks are 300 feet long, and 8 feet diameter in the centre, tapering, of course, in a regular parabolic curve, to a point at each end. They are placed, as above stated, parallel to each other, and I be-

lieve 16 feet inside apart in the clear. The wheel between them is about 30 feet diameter, and 15 feet in length. The buckets are so arranged, as to number and situation, as to prevent the jolting motion felt in the other boats as the buckets strike the water.

To ascertain the buoyancy of this boat, or the burthen she will carry, I take the common method to measure a parabolic spindle—thus:  $8 \times 8 \times 7854 = 50.2656$  superficial contents at centre;  $300 \times 8 \div 15 \times 50.2656 = 8042.4960$  cubic feet, solid contents, say 8042.5 cubic feet;  $\times 62 = 49863.5$  pounds weight of water displaced by each spindle, equal to 222 tons 12 cwt. Then the two spindles will require 222½ tons, including their own weight, to sink them to their centre; in which case they would only draw 4 feet of water. Allow, then, the boat and machinery to weigh 70 tons, which I think is not below the truth, and allow 500 passengers to weigh 37½ tons, then the boat, machinery, and passengers will weigh 107½, and will require 115½ tons more to make it draw 4 feet of water.

If the above calculations be true, and they cannot be far out of the way, the boat, with any reasonable load, will never draw 4 feet, and seldom so much.

With respect to her speed, the time and room will not admit of mathematical calculations, though they could easily be made; and Mr. B., who appears to me to be a man of scientific as well as practical knowledge, has doubtless made them; but I am confident, from her great length, narrow breadth, and light draught, she will equal in her motion the most sanguine expectations. I am confident, that with a little practice to get her waywise, she will make the trip to New-York and back, allowing a reasonable stop there, not only by sunshine, but an easy day's work.

It has been said she cannot live in rough water. On this point, I have no hesitation in saying that the same weight of materials could not be combined to form a vessel in any other shape with greater, if with equal strength; and one peculiar advantage it possesses over any other steamboat in rough water is, that her whole weight is borne on the outside of her width, while that of other steamboats is in a narrow compass in the middle: where, therefore, the common boat in a rolling sea is liable to upset, or displace her machinery by rolling, and will almost constantly have one wheel out of water, Mr. B.'s boat, standing upon a broad foundation, can roll but little, and the wheel, by being in the middle, will of course maintain an even depth in the water, and the swell not consequently interrupt her speed.

On the whole, from the opinion I entertain of the talents of Mr. Burden, and from what I have seen of his boat, if the invention does not mark a new era in the history of locomotion, as respects rapid and safe travelling, I will willingly submit to be branded as a false prophet.

Yours, respectfully,

S. BLYDENBURGH.

\* Mr. Burden states that from 180 to 200 tons burthen will occasion a draught of 4 feet.

**THE UNDULATING RAILWAY.**—For the purpose of further testing this important principle, several experiments have been tried since our last publication, of which the subjoined is the result:

It was determined by the engineers who witnessed the last experiments, that another trial should be made to prove the possibility or otherwise of conveying on an undulating line double the load which the engine was capable of drawing, at a like velocity on the horizontal railway.

The only day on which it was thought this experiment could safely and satisfactorily be made on Sunday week a train of loaded carriages, weighing 150 tons, exclusive of the two engines which moved them and their tenders, left Manchester for the Sutton inclined plane.

On this occasion it may, in truth, be said that

there never was a more friendly assemblage of mechanical men. It is well known to some of our readers that the French Government have selected a body of the most eminent engineers in that country to visit England, with a view of acquiring all requisite information preparatory to the construction of the intended French lines of railway. These gentlemen, nine in number, were all present; the English engineers who attended being Mr. Robert Stephenson, senior, the Messrs. Daglish, Mr. Dixon, and Mr. Badnall, in addition to whom were nearly all the practical mechanics connected with the railway, and many others, (among whom was Mr. Case, of Summerhill, and Mr. Garnett, of Manchester,) who felt a deep interest in the result.

The following statement is an undeniable corroboration of the favorable opinion which we have before expressed on this subject.

Mr. Badnall had proposed, as an extreme test of the merits of the undulating principle, that a double load should be attached to the engine, which he was of opinion could be moved with facility, and with one engine on a curve; and it cannot fail to be interesting to the world at large to know that the experiments fully proved that his opinion on this subject was correct. The following explanation will verify our meaning:

**Experiment 1.** Two engines, the Firefly and the Pluto, brought the whole train of waggons, (the length of the train was about 151 yards,) weighing 150 tons, exclusive of engines and tenders, to a given point at the foot of the Sutton inclined plane, the velocity attained at this point being about 19 miles per hour. The Pluto then left the train and the Firefly ascended with the load 575 yards in 116 seconds; the distance traversed by the two engines to generate the velocity before ascending being at least one mile.

**Exp. 2.** The power of the Firefly being reversed, the engine and load descended 575 yards in 74 seconds; the velocity attained at the foot of the plane being far greater than at the same point when ascending.

**Exp. 3.** The Firefly and Pluto having traversed 1 mile to generate a velocity of 15 miles an hour, and the Pluto then leaving the train, at the foot of the inclined plane, the Firefly and load ascended 315 yards in 90 seconds.

**Exp. 4.** The Firefly's power being reversed, the whole train descended 315 yards in 65 seconds.

**Exp. 5.** The same engines and load, working about 1½ miles, attained a velocity of 18 miles an hour; the Pluto left as before, and the Firefly and load rose 457½ yards in 102½ seconds.

**Exp. 6.** The Firefly and train descended 457½ yards in 80 seconds.

**N. B.**—On this occasion some delay occurred in reversing the power, which will account for the comparative difference in time.

**Exp. 7.** The two engines, as before, attained a velocity of 18 miles an hour at the foot of the ascent, the Pluto then left the train; and the Firefly shut off her steam, the whole train then rose, by momentum only, 332 yards in 70 seconds.

**Exp. 8.** The train descended (the Firefly working) 323 yards in 66 seconds.

The preceding experiments undoubtedly prove two most important facts, not only that a locomotive engine can convey, on an undulating line, double the load which it is capable of conveying at the same velocity on a level, but that it can accomplish this by the employment of only one half its power, which last-mentioned fact was decided by the last experiment.

The Board of Examiners, at the head of which was Professor Silliman, appointed to investigate the cause of the destruction of the steamboat New England, have reported that the sole cause of the bursting of the boilers was the immense pressure of steam to which they were subjected, through the negligence of the Engineer.



*Essay on economizing Fuel and Lighting in Private Dwellings.* By the Rev. PATRICK BELL. [From the Quarterly Journal of Agriculture.]

#### I. THE ECONOMY OF FUEL OR HEATING.

—Of all the substances now used for fuel, coal, it must be admitted, takes the pre-eminence. It has been divided by Thomson into four species, viz. caking-coal, splint-coal, cherry-coal, and cannel-coal. The first, or caking-coal, is that which abounds in the Newcastle coal field. Its value as a fuel stands very high; and, from experiments, the fact has been ascertained, that in a well constructed furnace, 1.2 lb. of it will raise a cubic foot of water from the temperature of 52° to 212°, the boiling point.

Splint or hard coal is that which is found abundantly in the coal-fields of Glasgow and Ayr. Experiments made upon this coal have shown that 3.13 lb. are required to raise the temperature of a cubic foot of water from 52° to 212°. Its relative value, therefore, as a fuel, compared with Newcastle coal, is the proportion of 1 to 2.6.

Cherry or soft coal is the species that abounds in Fifeshire, (that of Mid and East Lothian being intermediate between the cherry and the splint-coal.) This coal inflames readily, giving out much heat. Its power of heating seems to be about one-third less than caking coal, 1.5 lb. being required to raise a cubic foot of water from the temperature of 52° to 212°.

Cannel-coal is found less or more abundant in most of the coal fields of Scotland, and in some of those of England. During combustion it yields a great deal of light, and its heating power is found to be nearly the same as that of splint.

Wood, which holds the next place to coal as an article of fuel, is subject to great variety in heating power, some species of timber possessing that in a much higher degree than others. Generally speaking, old full grown healthy timber yields most heat, but such timber is of too much value for other purposes to be applied as fuel in this country. The following table is given on the authority of Count Rumford, and others, exhibiting at one view the power of various species of wood in producing heat. The number indicates the quantity of timber in pounds, required to raise the temperature of a cubic foot of water from 52° to 212°.

Lime-tree, 3.10 lb.; beech, 3.16; elm, 3.52; oak chips, 4.20; ash, 3.50; maple, 3.00; service-tree, 3.00; cherry-tree, 3.20; fir, 3.52; poplar, 3.10; hornbeam, 3.37.

The next substance in the order of importance is peat. This fuel varies much in quality, according to the situation in which it is produced. Dr. McCulloch has divided it into five classes,—Mountain-peat, Marsh-peat, Lake-peat, Forest-peat, and Marine-peat: the names implying the locality of their production. Of these, the Mountain-peat, from its loose spongy texture, is the least productive of heat; and, in all the kinds, the heating power is in the ratio of the density of the mass. From experiments it appears that, on an average, 7.6 lb. are required to raise the temperature of a cubic foot of water from 52° to 212°; but were the peat compressed by a proper machine, there can be no doubt that its heating power would be considerably increased.\*

\* The experiments of Mr. Todd, on the compression of peat-moss, show that the heating power of compressed

Coke and charcoal are substances prepared from any of the preceding, by submitting them to combustion, under circumstances that exclude them either entirely or partially from the access of atmospheric air. The substances thus prepared vary in the same proportion as the originals from which they are prepared; but it has been stated generally, that 1.1 lb. will raise a cubic foot of water from 52° to 212°; of wood-charcoal 1.52 lb., and of the charcoal of peat 3.28 lb., will each produce the same effect.†

I have thus endeavored to give a comparative view of the heating power of the different substances now in common use as fuel; but to give a scale of the comparative cost of these is a department of the subject that cannot be entered upon in this paper, seeing that it is loaded with so many contingent and local circumstances. The economist must, therefore, take the data that are here furnished, and laying these to the expense attendant on the procuring of the fuel within his reach, he will draw his conclusions accordingly.

The next point of consideration is the means of applying, with the greatest advantage, the fuel already described, and the means of distributing the heat in our apartments. Three different modes have been adopted,—that of the open fire, the common and the heated air stoves, and also the agency of steam. In the first method, which is the most generally adopted in this country, considerable saving of fuel may be effected by attending to the following remarks. Since the heat that a room receives from an open fire arises chiefly from radiation and reflection, it is important that the position of the grate in which the fuel is burnt be attended to, and of this the position of the covings has a considerable influence. These, when placed at a proper angle, give out a large portion of heat by reflection, in aid of that sent out direct from the front of the fire-place by radiation. The angle that is considered the best for effect is that of 45°. In fixing grates, the less the quantity of solid matter that is used, so much greater will be the heating effect of the fire, as such solid matter serves as a conductor to carry off heat in a direction contrary to what is wanted. The flue also has its share of influence. This ought to be as large as possible, to be regularly formed, free of abrupt turns, and to have a smooth surface; the throat, or lower part, should be somewhat contracted, and the chimney top ought to be sloped upward, or brought to a comparatively thin edge, instead of the level surface too frequently adopted. It has been ascertained by experiment that a well constructed grate will consume about 1 lb. of coal per hour for every three inches of its length,—that is to say, a grate of 15 inches fire-place will burn 5 lbs. of coal per hour.

Heating apartments by means of stoves, though much resorted to on the Continent, has never to any extent been introduced into Britain. In the common stove the heat is procured entirely by radiation from the surface of the stove and flue; but it is found not to afford such a salubrious atmosphere as the open fire, where a constant and rapid

peat is at least equal to that of common coal, taking weight for weight.

† We believe that the charcoal of compressed peat has not yet been submitted to the test of experiment. The subject is of some importance; and the individual, who would conduct a series of experiments, to determine its value, would confer a benefit on the country.

current of air is received and passed through the room. Heated air stoves have of late years been successfully employed for heating large establishments, as hospitals, churches, &c. In this, the stove is usually at a little distance from the apartments to be heated. A current of air is heated by passing it over a cockle, from which it is carried into flues to the different points where its effects are required. This appears to be an economical method of heating such large establishments, but it seems not so well adapted to ordinary dwelling houses.

The last method of heating apartments, that we have to notice, is by steam. This powerful agent, besides its being so admirably adapted to impel machinery, appears also to be the most economical for the diffusion of heat through a suite of apartments, and has been adopted with perfect success in many of our manufactories. In these, the practice is to carry a system of cast iron pipes through the apartments to be heated. Steam is received into these from a boiler; the metal is heated, and gives it off again by radiation to the apartment. This, though a very effective mode of accomplishing the object in such situations, is yet of a nature not suited to the elegance of modern dwellings, more especially as the open grate forms an ornament of no small importance in our best rooms. Could the prejudice, however, be once overcome, there could be no difficulty of introducing the system of heating by means of steam into all sorts of dwellings, and the following method of arranging the apparatus is submitted.

In the kitchen a boiler of considerable dimensions is to be set in a furnace, with all the requisite appendages of safety-valve, feed-pipe, &c. A large steam pipe passes from the boiler, through the kitchen, and along the passages, branches from which enter every apartment, each provided with a stop-cock, to shut off the supply of steam when requisite. To determine the size of the boiler, we shall take a particular example—a house of 50 feet by 20 feet. To heat this house, the boiler has a capacity of 10 cubic feet, and being of the usual wagon-shape, its dimensions are 3 feet long, 2 feet wide, and 2 feet deep; such a boiler requires a supply of water equal to 4 cubic feet for every 12 hours it is kept boiling, and a bushel of coal is sufficient to keep a constant supply of steam for a day. The same boiler may be made subservient to the ordinary purposes of the kitchen by allowing the steam to pass into a properly constructed vessel. Perhaps the best construction for this is, that the vessel intended to contain the fluid that is to be boiled should be incased within another of the same form, but leaving a space all round the sides and bottom to contain the steam, having a stop-cock to draw off any water that may be condensed during the operation.

Any number of such vessels may be ranged upon a stand, each connected by a branch and stop-cock to a steam-pipe from the boiler, and they may be all made to boil together, or any one or more of them, as may be required. The outer surface of these cooking vessels should be kept bright, in order to prevent the loss of heat by radiation, while the steam-pipes for heating the house should be kept black on the surface, to promote radiation as much as possible. For this reason, pipes of cast iron are better for heating rooms than those of tin plate. With



the diameters equal, it has been found that double the length of tin-pipe is required to yield the same quantity of heat that would be derived from cast iron. With cast iron pipes of four inches diameter, a room of ordinary dimensions may be kept at a temperature of 62° with a boiler whose entire capacity is six cubic feet. In constructing an apparatus of this kind, the steam-pipes should be all laid with an inclination towards the boiler, that the condensed steam may run back to the boiler, thereby supplying it with hot instead of cold water, by which a saving of fuel is effected. In this variable climate, especially in winter, much inconvenience is often experienced in the drying operations of the laundry: this might be obviated by applying steam to that purpose, in a room properly fitted up.

**II. ECONOMY OF LIGHTING PRIVATE DWELLINGS.**—In this branch of the subject I shall pass over the ordinary methods of procuring light from oil, tallow, wax, &c. and consider only the modern improvement of lighting by gas procured from coal—an invention which must be considered amongst the most remarkable discoveries of this discovering age. It is not necessary to go into a historical detail of the steps by which the discovery was effected; our purpose will be better answered by giving an account of a small gas apparatus which was constructed, and has been kept in use for two years, for lighting a small private house in the country, remote from gas works, properly so called.

The first attempt at this apparatus originated in the idea of placing a retort in the kitchen fire. It was soon found that the heat of an ordinary fire is insufficient to decompose the coal in the retort, so as to yield the full quantity of gas that might be expelled from it. It was also found to be very inconvenient in other respects. Recourse was now had to the erection of a small house to contain the whole apparatus. The dimensions of this building were twelve feet long by nine feet wide and nine feet high. Before describing the apparatus it may be well to glance at the principles on which the process of making coal gas depends. It is to be observed that every kind of coal yields gas; but the different kinds yield products which differ widely both in quantity and quality. Cannel coal has been found to yield not only a greater quantity, but also a purer gas, than any of the other species of coal, and, as a matter of course, is always to be preferred when it can be procured. The gas is extracted from the coal by a process of distillation, whereby the volatile parts are driven off in the form of a crude gas, combined with a variety of other substances, the principal of which are tar and water of ammonia. When the gas has left the retort in which the distillation is carried on, it is first freed of the tar and water by condensation in vessels exposed to cold; it is then brought into contact with lime, by which the remaining portions of offensive matter are absorbed: this consists chiefly of sulphur, which, being combined with part of the gas, forms sulphuretted hydrogen, but the lime having a strong affinity for that substance, they combine, and leave the gas in the state of carburetted hydrogen, sufficiently pure for use.

The apparatus now to be described is represented in the two annexed cuts. Of these fig. 1 is a ground plan of the house and apparatus, and fig. 2 being a prospective view of the same, in which the front

Fig. 1.

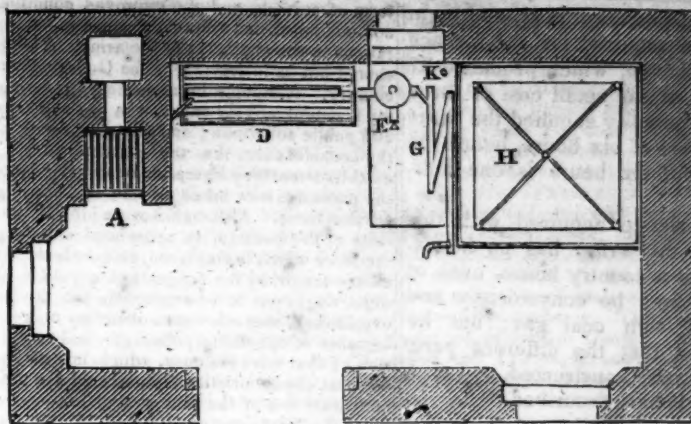
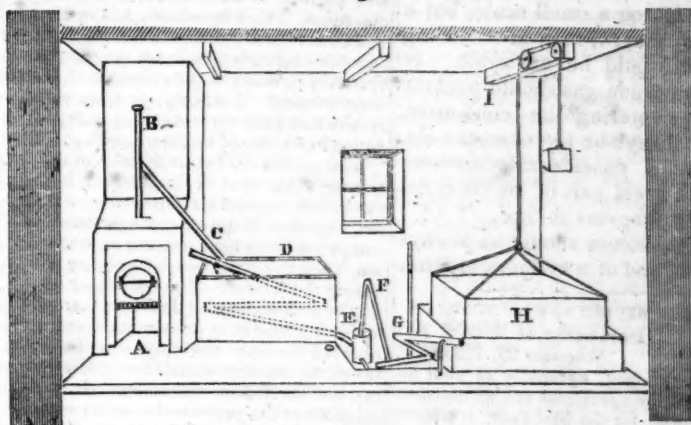


Fig. 2.



wall of the house is supposed to be removed; the same letters of reference applying to both figures. A is the furnace with the retort; the latter is 15 inches long and 5 inches diameter, of cast iron, and contained a charge of 8 lbs. of coal. To the upper side of the retort, and near its mouth, is joined an iron pipe, B, about one inch in diameter, left open at top, for the purpose of cleaning off the crust of tar that forms on the inside, but while in operation the opening was closed with a wooden plug. The sloping pipe, C, conveys the gas onward to the cooler or condensing vessel, D. This is an oblong trough, which being kept full of cold water, and the pipe which thus conveys the gas being made to traverse the trough in the direction of the dotted lines, having at the same time an inclination towards the tar cistern. This retardation and cooling promotes the deposition of the tar and watery parts, which are borne forward by their own gravity along the slopes of the pipe, while the gas thus separated is pushed onward by the pressure from the retort, until they arrive in the cistern E. The tar and water are deposited in the bottom of this vessel, which is air tight, except by the insertion of the bent pipe F, by which the gas is allowed to pass off towards the purifying vessel. The tar cistern is also furnished with a plug in the bottom, by which the liquids can be drawn off when they accumulate. The purifying vessel G is composed of three inclined pipes, joined as in the figure: these are open at top and bottom, but fitted with plugs for the convenience of filling and discharging the purifying liquor. This vessel is filled about two-thirds full of slacked lime and water brought to the consistency of thin cream, and the gas being forced through this by the pressure from the retort, it is deprived of the sulphur with which it was com-

bined. The gas now passes through the small pipe connected with the upper end of the purifier, and enters the gasometer H from below. The gasometer is a vessel in which the gas is stored up for use. It consists of two parts, the tank and the gasholder: the tank or lower part is filled with water, and the gasholder, which is an inverted vessel, is a few inches less in diameter than the tank, to give freedom to its motions within the other. The gasholder is suspended by a rope or chain over the pulleys attached to the beam I, and balanced with a weight attached to the rope. The induction pipe, after leaving the purifier, descends, and, entering through the bottom of the tank, rises again in the inside of the gasholder, till its extremity is an inch or two above the surface of the water. The end of the pipe is here furnished with a cup, which constitutes a water valve, allowing the gas to enter, but preventing its return.\* The induction-pipe is placed in a manner similar to the last, passing through the bottom of the tank, and rising again on the outside as at K, where it is furnished with a stop-cock, and from this point the branch pipes can be carried to the apartments that are to be lighted.

From the way in which this apparatus was erected, even an approximation cannot be made to the total expense, but, exclusive of the house and the gasometer, the actual outlay amounted only to £2 7s.† The gas-holder being a cube of 3 feet, it contains 27 cubic feet of gas, which supplied three single jet burners. The retort was usually

\* In the large gas works this valve is not used in the gasometer, but a more efficient method is adopted to prevent the return of the gas to the retort, by means of what is called the hydraulic main; this is a tubular vessel, placed horizontally, and kept half full of water, the pipes from all the retorts dip into this liquid, and through it the gas is forced by the pressure from the retort, but is effectually prevented from returning by the intervention of the water.  
† Equal to \$9.75.



charged with eight pounds of coal, and eight pounds more were required for the furnace to work off this charge, which produced 27 cubic feet of gas, at the small cost of three halfpence. This quantity supplied the three burners for a period of six hours, hence the cost of one light for six hours is one half-penny.

From the experience acquired with this simple apparatus, the writer has no hesitation in saying, that a country house, even of ordinary extent, may be conveniently and profitably lighted with coal gas; but he would recommend that the different parts should be substantially constructed, and on a larger scale than is here described.

**NOTE.**—The apparatus here described is exceedingly simple, and very well adapted for an establishment on a small scale, but it may be proper to remark, that, in extending it, some deviation would be advisable. In the first place, the crude gas should pass the tar-cistern before entering the condenser, and if, as should always be the case, the cistern is placed at a considerable distance from the retorts, a great part of the tar is deposited during its progress thither. \* \* \*

The gasholder should be always made of sheet iron, and of a cylindrical form.

#### REPORT OF THE SECRETARY OF WAR.

DEPARTMENT OF WAR, }  
November 29, 1833. }

**Sir:** In submitting to you, agreeably to your instructions, a report of the operations and administration of this department for the past year, it affords me pleasure to bear my testimony to the zeal and ability of the respective officers at the head of the various bureaus, and of those employed to aid them in the performance of the important functions committed to this branch of the Executive Government.

A reference to the accompanying reports and documents will show the state of the army, as well with relation to its numbers, and their position and condition, as to the progress of the various works entrusted to them, and the collection and preservation of the necessary *matériel* for offensive and defensive operations, which is indispensable to the safety of the country. The principle, which governed the reduction of the army from a war to a peace establishment, has been found, by subsequent experience, to be salutary; and its practical operation has been to form a body of officers, equal in all the requisites of military knowledge and efficiency to those of any other service which is known to us. The army is so organized, that, should an increase become necessary, in consequence of those conflicts of interest and opinion to which all nations, in their intercourse with one another, have been exposed, and from which we have no right to expect perpetual exemption, any reasonable addition may be made to it without disturbing its arrangement; and the professional knowledge and experience embodied in it, will be immediately felt in the new corps, and will identify them with those previously in service. The military experience of other countries, as well as our own, has shown that the system of extension, by which new and old troops are incorporated together, is much better calculated to produce discipline and subordination, and thus to meet the exigencies of a service, which does not allow large bodies of troops to be kept up in time of peace, than the organization of separate corps, composed of inexperienced officers and men, with all their military knowledge to acquire, and all their military habits to form. And this is more particularly true of the staff department of an army, upon which its movement, its subsistence, and the economy of its administration, must principally depend. The system established in our service is equally creditable to the army and satisfactory to the Government, and may be applied, to any necessary extent, without any diminution of that economy and efficiency which have heretofore marked its operation.

Much advantage is anticipated from the operation of the act passed at the last session of Congress for improving the condition of the army. Already its effects have been felt, as the subjoined documents will show, in the decrease of desertion, and in the increase of the business of recruiting. The addition to the pay of the rank and file, the reduction of the

term of service, and the improved condition of the non-commissioned officers, promise important meliorations in the character of the army. This prospect cannot but be interesting to the Government and the country. Although the numerical strength of the army is comparatively small, it is yet sufficient to excite public solicitude; and this must be increased by the consideration, that the character of our military establishment may hereafter essentially depend upon the measures now taken for its moral and intellectual advancement. Although it were idle, in the present state of the country, to apprehend any danger from the force which is employed, still the lessons of experience taught by the progress of events in other nations, ought not to be neglected, nor the possibility overlooked, that other circumstances may lead to the increase of our military strength, and to the diminution of that wise jealousy, which is now one of our national characteristics. Moral habits in the soldiery constitute one of the best safeguards against the abuse of military power, and their inculcation has engaged the attention of this department, during successive periods of its administration. Amongst other measures, which have been adopted with this view, you have recently directed the discontinuance of all parades on Sunday, in order that that day may be exclusively devoted to the purposes of instruction and improvement. Certainly, in time of peace, no just reason can exist for converting a day of rest and devotion into a day of military parade.

The act for the better defence of the frontiers, by raising a regiment of dragoons, is in the process of execution. About six hundred men have been enlisted, and most of the officers appointed, and five of the companies have been ordered to proceed to Fort Gibson, upon the Arkansas, where they will be stationed during the winter. The remainder of the regiment will be concentrated at Jefferson barracks this season, and it is intended in the spring to order the whole to proceed through the extensive Indian regions between the western boundaries of Missouri and Arkansas, and the Rocky mountains. It is deemed indispensable to the peace and security of the frontier, that a respectable force should be displayed in that quarter, and that the wandering and restless tribes, who roam through it, should be impressed with the power of the United States, by the exhibition of a corps so well qualified to excite their respect. These Indians are beyond the reach of a mere infantry force. Without stationary residences, and possessing an abundant supply of horses, and with habits admirably adapted to their use, they can be held in check only by a similar force, and by its occasional display among them. Almost every year has witnessed some outrage committed by them upon our citizens; and as many of the Indian tribes from the country this side of the Mississippi have removed, and are removing, to that region, we may anticipate their exposure to these predatory incursions, unless vigorous measures are adopted to repel them. We owe protection to the emigrants, and it has been solemnly promised to them; and this duty can only be fulfilled by repressing and punishing every attempt to disturb the general tranquillity. Policy and humanity equally dictate this course, and there is reason to hope that the display of this force will itself render unnecessary its hostile employment. The more barbarous tribes will perceive that their own safety is closely connected with the permanent establishment of pacific relations both with the United States and with the other Indians.

It is due to the regiment of dragoons to remark, that its composition is believed to be good, and, I anticipate, it will do honor to the army, and render effectual service to the country.

I feel it a duty once more to ask your favorable interposition in behalf of the medical corps. There is no portion of the army, whose compensation is so utterly inadequate to their services. The pay of the highest grade but little exceeds that of a captain, and the pay of the lowest that of a first lieutenant; and these two grades constitute the whole range of service within the reach of medical officers. In the line of the army, and most of the staff departments, there are successive gradations of rank, each with increased emolument, to stimulate the exertions, and to reward the services, of the officers. The importance of professional skill and talent in the medical corps, will not be doubted; and the dispersed condition of our army in time of peace, and its exposure to the effects of various climates, render the conservation of its health an object of much solicitude. And in time of war, this solicitude will be increased by the perils of active service.

In order to place in a proper condition this branch of our military establishment, a system of examination has been recently instituted, by which the pretensions of medical gentlemen seeking appointments

in the army, will be subjected to rigid scrutiny. A board, composed of able and experienced surgeons, has been organized, and the various members of the department have been examined by them. The result has already been highly useful, and cannot fail to be so in future. But while the standard of professional acquirement is thus increased, justice demands that the rate of compensation should be examined, and that it should be rendered commensurate with the duties and responsibility of this most useful class of officers. It is not to be expected, that the medical corps can retain the able men, who now compose it, or see others join it, unless their services are adequately rewarded.

The act organizing the Subsistence Department expires, by its own limitation, on the 2d day of March next. It was originally passed in 1818, and has been continued by successive temporary acts till the present time. The reason of this course of legislation is undoubtedly to be found in the fact, that the introduction of the system was an experiment, and it was deemed prudent to test its operation, before a permanent character was given to it. This has been fully done, and the result is in every point of view satisfactory. All who were acquainted with the mode of supplying the army previously to, and during the late war, and for a few years after its termination, must be sensible of the superiority of the present plan. In the quality of the provisions, in the certainty of the supply, and in the economy of administration, its operation is decidedly superior to the old system, where contractors furnished and issued all the subsistence required. The continued failures that took place, and frequently in the most critical state of affairs; the controversies arising out of perpetual attempts to issue unsound provisions; and the serious obstacles which these and the other operations of the system interposed to the public service, must be fresh in the recollection of every military man who participated in the events of those periods. The army is now well and promptly supplied, and the faithful officer at the head of the Subsistence Department has established a system of purchasing, of issuing, and of responsibility, which, while it insures this result, guards the public interest against loss and imposition as far as a business necessarily so extended permits. During the fifteen years in which this department has been in operation more than five millions and a half of dollars have been expended under its direction, and the whole loss which has been incurred by the defalcation of its officers, does not amount to 16,000 dollars.

I consider that the time has arrived when the present arrangement should be rendered permanent, and I therefore present the subject with that view to your notice; and I also beg leave to suggest that the compensation of the clerks in the office should be increased. It is now lower than the average amount allowed in other public offices, and less than is due to their labor and responsibility.

The report of the Visitors appointed to examine the Military Academy, shows that the institution is in a prosperous condition, and is fulfilling the duties committed to it, in the education of the young men destined for the military service of the country. The suggestions made by the Visitors, for the improvement of this national school, are the result of a careful examination, and coming, as they do, from a body of able and impartial citizens, are entitled to much consideration. They appear to me just in themselves, and promising, in the event of their adoption salutary consequences to the institution.

There is one subject which I feel particularly desirous of placing before you. The situation of teacher of drawing corresponds neither with the nature and importance of the duties required of that officer, nor with the professional merit of the distinguished artist who has relinquished the fair prospects held out to him in a foreign country, to accept it. The art itself is highly important to military men, and its acquisition is essential to a respectable standing at the academy. It is very desirable that the instructor should unite in his person those high qualifications, natural and acquired, which have in all ages been the lot of those who have attained eminence in the art, and which have placed it among those pursuits that are at once the cause and the effect of advanced improvement in society. I respectfully recommend that this officer be placed in the same situation as the professors at the academy, and I cannot but believe that such a measure would not only be just in itself, but would be a proper tribute of respect to the liberal arts, and a proper notice of one whose professional talents and success have been honorable to this country.

I have had the honor, therefore, to submit to your consideration my views in relation to brevet commissions in the army, and I am induced, as an act of



justice to those entitled to them, again to present the subject. If no new legislation is contemplated, nor any action of the Senate which shall change the principle or practice heretofore prevalent, no objections occur to me to delay any longer those promotions. The officers have earned them by length of service agreeably to the established usage; and to make a discrimination, without any previous declaration, so as to exclude from this advantage those who are at this time entitled to it, does not seem called for by the exigency of any circumstance connected with this subject; and, in fact, there are no very obvious reasons occurring to me, why these professional honors which, in common cases, make no demand upon the Treasury, but serve to foster those professional feelings which give elevation to the military character, should not be granted as they have heretofore been. Under ordinary circumstances, they would produce no practical operation, either with relation to emolument or command.—When they should do either, it would be precisely when their value would be enhanced by the very state of things producing this change in their operation; when the greater experience of the brevet officer would entitle him to an enlarged command, and to a corresponding rank over those, whether in the regular army or the militia, whose qualifications, so far as these depend upon service, are less than his.

The attention of the army has been frequently drawn to a project for the establishment of a fund for the support of invalid officers, and of the widows and children of such as may die in the service. The object is a commendable one, and as the only aid expected of the Government is such legislative provision as may be necessary to give effect to the measure, in conformity to the general views of the officers of the army, it is certainly entitled to the favorable regard of the Government. A moderate and stated deduction from the pay of each officer would create a fund which would afford essential relief to many who otherwise would be exposed to want and penury, and might soothe the declining years of meritorious officers who may have necessarily expended, in the maintenance of their families, the whole allowance made to them by law, and who, without such an arrangement, would look forward with anxiety to the future. Whatever plan may be ultimately adopted, a legal organization is essential to its operation and success; and as the funds will be provided by the officers themselves, and for their own advantage, the administration will no doubt be committed to them, to be exercised by such persons, and in such manner, as they may direct. The considerations connected with this measure are so obviously just, and in accordance with the dictates of prudence and humanity, that I trust they will be favorably considered.

And I also feel it my duty to bring before you a kindred subject connected with the rank and file of the army, and having for its object a provision for the superannuated soldiers. In our service, as at present organized, a soldier can only be retained as long as his physical powers are sufficient to enable him to perform the duties required of him. When his constitution fails, unless it is the result "of disability, incurred in the line of his duty," he is discharged without any provision for his support, and generally, from the habits of his life, without the disposition, and too often the power, to labor for the means of support. He is then thrown upon the charity of the community, after devoting the best part of his life to the service of his country.

This result may be easily obviated without expense to the Government, and an ample provision made for those discharged soldiers who are unable to procure the means of support. The principle which has been long and wisely applied to the navy, may be safely applied to the army. An inconsiderable deduction from the pay of each soldier would go far towards the creation of a fund for this purpose; and if this deduction were to commence with those who might enlist after the passage of the law, there could be no objections on account of the previous engagements formed with the soldiers. And there are three auxiliary sources of revenue which may be applied towards the former object.

These are, fines assessed by courts martial.

The pay due to soldiers who may die without leaving any heirs to claim it.

A proportion of the post fund, which is principally derived from a tax upon sutlers.

It is believed that the means which may be realized agreeably to this suggestion, would be found sufficient to provide for the maintenance of this class of persons, whose condition is now so hopeless, and so unsuited to the character of the Government and the feelings of the community.

The experience of every year adds to the conviction, that the sooner the Indians remaining east of

the Mississippi, migrate to the region west of that river, the sooner will they be relieved from the embarrassments of their present position, and placed in a situation where they may physically and morally improve, and look forward to a prosperous and permanent destiny. All the reports which reach the department upon this subject, concur in the representation, that the emigrants already there are comfortable and contented; that the region assigned to them is fertile, salubrious, and as extensive as they and their descendants, for many generations can require. They are making improvements, and erecting dwellings, and are evidently laying the foundation of a social system which, it is to be hoped, will afford them security and prosperity. As a striking proof of their improvement, and of the quantity of provisions raised among them, it may be stated, that one of the contracts for furnishing provisions has been taken by a Choctaw, who is said to have a supply of his own amply sufficient to enable him to meet his engagement. It is fortunate for the Indians themselves, and for the great cause of humanity, that the efforts of the Government to persuade them peaceably and voluntarily to remove, are every year crowned with more and more success. Since the last annual report from this department, the conditional arrangement made by the Seminoles for their emigration, has been rendered absolute by a personal inspection of the country proposed for their residence. They have examined, and are satisfied with it, and if the treaty should be ratified by the Senate, they will soon leave the Territory of Florida. An arrangement has also been made with the separate bands in that territory, by which they have agreed to emigrate, and thus provision has been made for the removal of the whole Indian population from Florida.

The treaty with the Chickasaws has terminated all difficulties with that tribe. It is understood that the exploring party provided for in that instrument are about to commence their journey with a view to select a residence west of the Mississippi. If they succeed, they will remove within the period limited. If they do not, and choose to remain, they will become, with their own consent, citizens of Mississippi, and will occupy, as absolute owners, the several tracts of land assigned to them.

The obligations assumed by the United States in the treaty with the Choctaws, for the removal of those Indians, have been fulfilled. From the reports which have been made to the department, it appears that about fifteen thousand individuals of this tribe have been removed. A party, estimated to contain from fifteen hundred to three thousand persons, have changed their usual place of residence in Alabama, and have declined accompanying the other Indians in their emigration. It is believed that this party is composed principally of the worst portion of the tribe, and that they intend to hang upon the white settlements, in order to indulge the vicious habits they have acquired. As the Government has scrupulously fulfilled its engagements with these people, which terminate this year, and as every exertion has been made by the proper agents to induce them to remove, nothing remains but to leave them to the results of their own experience. It cannot be long before they will feel the necessity of rejoining the great body of the tribe.

Satisfied as you have been, that the very existence of the Creeks in Alabama required their establishment in the country west of the Mississippi, where so many of their tribe already reside, you have not hesitated to embrace every opportunity which offered of accomplishing this object. Instructions have been three times given to ascertain their views, and to endeavor to persuade them to acquiesce in this course. The two first attempts proved unsuccessful, the result of the last is unknown.—Independent of the general reasons arising out of our Indian relations, which operated to induce these efforts, the peculiar state of things among these Indians, and a strong desire to remove the difficulties connected with them, had much influence in directing the negotiations.

The Sacs and Foxes have quietly removed to the region assigned to them, and the Winnebagoes have left the country upon Rock river, agreeably to the stipulations of the treaty with them, and direct across the Mississippi, to their lands north of the Wisconsin.

Treaties have been formed with the Pottawattamies, Chippewas, and Ottawas, claiming the district on the west side of Lake Michigan, south of Green Bay and north of Chicago, for its cession to the United States and with the Pottawattamies of the peninsula of Michigan for the relinquishment of their reservation south of Grand river.

With the exception, therefore, of the Miamies in the State of Indiana, of a band of the Wyandots at

Upper Sandusky, in Ohio, and of scattered portions of the Ottawas and Chippewas in the peninsula of Michigan, north of Grand river and of Saginaw bay, probably not exceeding altogether five thousand individuals, the whole country north of the Ohio, and east of the Mississippi, including the States of Ohio, Indiana and Illinois, and the Territory of Michigan as far as the Fox and Ouisconsin rivers, has been cleared of the embarrassments of Indian relations; and the Indians themselves have either already emigrated, or have stipulated to do so within limited periods, and upon such terms as will ensure them adequate subsistence, and the means of establishing themselves comfortably in their new residence, unless, indeed, the aid and efforts of the Government are rendered useless by their habitual indolence and improvidence. The Cherokees occupying portions of land in Georgia, Alabama, North Carolina, and Tennessee, and probably not exceeding eleven thousand persons, are the only Indians south of the Ohio, and east of the Mississippi, with whom an arrangement has not been made, either for emigration, or for a change of political relations.—It is to be regretted that the same causes which have heretofore prevented an adjustment of the difficulties of that tribe, and their removal west, yet continue to defeat the efforts of the Government. These causes are no doubt principally to be traced to the ascendancy of particular individuals, and to their desire to retain political influence and power. It is expected that about five hundred of these Indians will remove west this season, and the residue of the Cherokees, then remaining east of the Mississippi, will be, agreeably to previous computations, about ten thousand five hundred.

The commissioners west of the Mississippi are engaged in the execution of the duties connected with our Indian relations in that quarter. They have succeeded in arranging satisfactorily the disputed question of boundaries between the Creek and Cherokees, which has, for some time, occasioned much embarrassment. They have also formed treaties with the Creeks, the Cherokees, the Senecas and Shawnees, the Quapaws and the Seminoles, of Florida, by which all matters connected with these tribes have been satisfactorily adjusted. Their labors will be now directed to the other subjects indicated in their instructions, and which are important to a permanent arrangement of the various questions arising out of a new state of things which will be created in that region. Among these, one of the most interesting is a practical plan for regulating the intercourse of the various tribes, indigenous and emigrant, one with another, and with the United States, and for the establishment of some general principles by which their own internal government can be safely administered by themselves, and a general superintending authority exercised by the United States, so far as may be necessary to restrain hostilities among them, and incursions into our borders. Until such a system is adopted, it is evident that the condition of those Indians cannot be secure, nor will the obligations imposed upon the Government be fulfilled. The task requires an intimate knowledge of the local circumstances of the tribes of that region and of the country they inhabit, and a practical acquaintance with Indian habits, feelings, and modes of life. I trust the commissioners will be able to report a plan which will fulfil the expectation of those who have observed with solicitude the course of this matter, and which will eventually secure the prosperity of the Indians. As it is probable, however, that this cannot be effected within the time limited for the duties of the commissioners, I would respectfully suggest the propriety of their term of service being prolonged until the close of the next year.

There have been presented for allowance under the pension act of 7th June, 1832, thirty thousand, six hundred claims. The whole of these have been examined, and either admitted, rejected, or returned to the parties for supplementary action. Twenty-three thousand four hundred and thirty-eight certificates have been issued, eleven hundred and eleven claims have been rejected, three hundred returned cases are in the office awaiting or undergoing re-examination, thirteen hundred and fifty-one, which are incomplete in their proofs, are suspended till these are furnished, and four thousand four hundred and twenty-five are in the hands of the parties for additional evidence or authentication, or in transitu between them and the office.

It is creditable to the industry and efficiency of the Pension Office, that such a mass of business should have been performed within the period which has elapsed since the passage of the above law.

I have the honor to be, very respectfully, sir, your obedient servant,  
LEWIS CARR,  
To the President of the United States.



## REPORT OF THE SECRETARY OF THE NAVY.

NAVY DEPARTMENT,  
November 30th, 1833.

To the President of the United States:

SIR: In submitting to your consideration a review of the operations of the Naval Branch of the public service during the past year, I would first invite your attention to its administration in this place.

The separate organization of the Navy Department, in the manner originally established by Congress, and the change since made by the addition of a Navy Board, have, with the several clerks now allowed, furnished a sufficient number of persons for the suitable discharge of all ordinary duties immediately connected with this office. So far as my knowledge extends, those duties have generally been performed with promptitude and accuracy. But some changes in the present laws respecting them, would probably prove beneficial. Though the number of clerks, and the aggregate amount of salary paid to them are deemed sufficient, yet more substantial justice could be enforced, if that amount were so appropriated as to permit the department to divide it, in conformity to the usefulness of their respective services. It has happened that some of them, receiving large salaries, perform no greater or more difficult duties than those receiving less pay; and no power exists here to equalize their compensation, except by an occasional transfer of duties, not always convenient, appropriate, or useful.

A different arrangement of the Navy Board, has, for a few years, been a subject of consideration by Congress. The board itself, and the head of this department, once united in recommending such a change as to apportion its ordinary business among the several members with a view to greater convenience, despatch, and responsibility. This could be accomplished without any material increase of expense; and it seems on many accounts very desirable. The reasons for the change have been so fully detailed in former reports, as not to need, at this time, further explanation.

There might be some useful alterations connected with the administration of the naval branch of the service in the office of the Fourth Auditor, whose duties, though nominally belonging to the Treasury Department, are intimately allied with, and very essential in most of, the operations of the navy. The great amount of property, which is in charge of this department, and which is yearly increasing, seems to require that a regular account of it should be opened in that office, and kept in such manner as to insure safety and responsibility. In another particular, improvement could be made. The old balances on his books, due from defaulters who were once in the naval service, are large; and though few such balances have occurred lately, yet the collection of all of them would doubtless be promoted, if it were devolved upon him, as the person who, from his official station, is best acquainted with the situation of the claims, and the means of payment possessed by the debtors, and who could act with most promptitude in securing the public.

Auxiliary to the central administration of the naval service, the inspection of our ordnance was, a few years since, assigned to an officer of rank residing in this neighborhood, and authorized to receive the usual extra allowances while engaged in actual duty. His employment during the past season has been much extended, having embraced the inspection of all our ordnance and ordnance stores in depot of all the naval stations. The result, it is hoped, may prove highly beneficial in our future operations. Under a similar arrangement, the custody and correction, as well as occasionally the purchase of charts, chronometers, compasses, and nautical instruments generally, were devolved on two intelligent officers stationed at this place. The system has worked favorably, and the small increase of expense attending it has been amply repaid in the better preservation and quality of those articles, and in the probable increase of safety to our vessels afloat, and to the lives of their gallant officers and crews. A specific estimate for the purchase and maintenance of a lithographic press is submitted as a means of saving, under charge of these officers, still more to the public in the procurement of charts, circulars, and blank forms, of such kinds as are employed, not only in this office, but at the several yards, and on board vessels in commission. (A.) Its various conveniences and usefulness in other respects, and especially in the drawings and plans connected with the survey of our coast now in progress, are more particularly detailed in the reports annexed. (B. 1 and 2.) To prevent any nominal or real increase of appropriations in consequence of the purchase of this press, it will be seen in the general estimates that a corresponding, or, indeed, a larger reduction has been made in what is asked for the

general contingent appropriations for this office, and for the service, and out of which appropriations most of the above articles are now provided.

It was formerly recommended to organize at this place a Naval Medical Bureau, and a bill is now on the files of Congress reported for that purpose. As that bill was not finally disposed of, I did not deem it proper to adopt any different system for attaining, in a different manner, most of the benefits expected to be accomplished by that measure. But if nothing be done during the ensuing session of Congress, regulating this subject, it is intended, under our present laws, that one of the older surgeons, in connexion with other services either at the barracks or navy yard in this city, shall be detailed and employed in performing many of the duties contemplated for a surgeon general.

The whole expenses the past year, for all persons situated here, and belonging to the administration of this department, as well as the expenses for the care and repair of our furniture, buildings, and the grounds appurtenant, were about \$48,000. This amount, I trust, will be thought to bear a favorable comparison with the same class of expenses at former periods, or in other similar establishments, when the large increase and extent of duties at this place are duly considered.

Passing from the central administration of this department to that of the persons connected with its operations elsewhere, I would next submit to your consideration a few remarks on the situation of such of those persons as fill official stations, but are not technically denominated naval officers. They are a large and useful class, belonging to what may be considered our civil list; and consist of agents, storekeepers, constructors, builders, schoolmasters, secretaries to commanders, clerks of yards, engineers, live oak superintendents; and some others attached to stations and hospitals.

In an establishment growing like the navy, in a few years from so small a beginning to its comparatively great size at the close of the late war, and at the present moment, it was perhaps unavoidable that many measures and appointments, considered as incidental to other important objects expressly authorized, should be left to the discretion of the department. In this way, most of the above persons have been employed and paid, usually by virtue of estimates and general appropriations, without any specific provision in any act of Congress regulating the manner of their appointment, or the amount of their compensation. Indeed, a system similar in some respects has been extended to others; as the only limit which now exists to the number of every class of naval officers is the same discretion, restrained solely by estimates and appropriations, and by the confirmation required from the Senate in the case of commissioned officers. These practices have not, in my opinion, been the safest; though the custom of this department to submit to Congress, through the Executive and otherwise, full communications of its doings in relation to most of these subjects, enables the Government to exercise any control deemed necessary over any supposed abuse. My own desire has been, whenever convenient and practicable, to impose still further limits on that discretion. With this view, on a former occasion, the estimates for the contingent appropriations were made by me more specific, and settled rules of allowances and compensation, in most cases, were established or collected, and then digested and published. The revision of our whole naval regulations by the board heretofore appointed for that purpose, will, when finished and adopted, probably introduce greater system and certainty in relation to some of these matters. But it still deserves consideration, whether additional legal provision might not judiciously be made concerning the appointment and wages of some of the classes before named. All the persons on the civil list now under consideration, are believed to have conducted, during the past year, with fidelity to their duties. The only essential changes in relation to them have been the following. There has been a discontinuance of two naval constructors, whose services were no longer needed; and new and more economical arrangements have been made as to the duties of some of our agents and storekeepers abroad. The few live oak agents, appointed for certain districts, who remained in office last December, have been dispensed with; and no salary is now paying on that account, except to one person, in temporary employ for a few months, in the examination of an unfinished district. In some cases in which we have had warranted officers competent to perform the labors assigned to persons belonging to civil life, and hired at some of the yards, it has been deemed sound economy to order the former upon

such duty, and to discontinue the services of the latter.

It has not been found necessary to select a permanent engineer; as the superintendents of the dry docks, and of the erection of the hospitals, have been able for the present to perform such duties as would have been required of him. But the additional schoolmasters authorized at the last session have been employed; and, it is hoped, with increased benefit to the class of younger officers. A general order has recently been issued with a view to improve the education of these officers, by requiring all midshipmen, whether passed or not, after suitable relaxation under leaves of absence, to attend on one of the naval schools for further instruction in the studies, and proficiency in the duties, belonging to their profession. It is intended to employ them not only in appropriate reading, nautical observations, and recitations, but in forming a more practicable acquaintance with the several materials used in the construction and equipment of vessels, and with the manner of preserving them, and of applying them in building and repairs. A due portion of their leisure will also be devoted to the performance of such services connected with our most important naval stations where the schools are established, as will be useful to the public, and at the same time advance them in a more thorough knowledge of the active duties which may soon devolve on them in higher and more responsible situations.

Excepting these variations, the civil establishments at the yards, and abroad, have not been materially altered during the year. It will be seen that the whole expenses of the persons connected with them have been considerably reduced, and are now annually about \$130,000. This does not include the wages of ordinary laborers; as these are more properly charged, according to their employment, under other heads, which will hereafter be considered—such, for example, as repairs of vessels, improvements at yards, or building of hospitals.

The only material change proposed in the civil list for the ensuing year, is a small addition to the very low compensation of some of the clerks at a few of the yards.

The remaining persons belonging to the naval establishment are the various officers and seamen of the navy. The general conduct of these the past year has been highly commendable. The very small number of courts martial, it is believed, has arisen from an improving spirit of harmony in the service, and from a mild, but firm and uniform system of discipline. Seldom has the health enjoyed on every station been better; and the superior condition of the medical corps, as well as of the hospitals, exercises on this subject a very salutary influence.

The number of officers in the different classes has generally been kept within the estimates. It is proposed to continue the number much as it now exists. There are now quite as many captains and surgeons as can be usefully employed; the former having been increased about 1-3d, and the latter 1-4th, during the last ten years. There are somewhat more lieutenants and midshipmen than might be deemed indispensable; the former within that time having been increased about one half, and the latter one-fourth; though, in making this comparison, it is proper to state that, previous to 1824, all these classes had occasionally been more numerous than they were at that period. But, in relation to the two last classes, no reduction from the estimates of last year is contemplated. It is considered that, on a peace establishment, they ought to possess ample and valuable materials for any sudden or large increase of the higher classes, which any national emergency may at any time require; whilst nothing is found to prove more injurious to older officers than to be placed in a condition where no further incentives to improvement, by anticipated promotion, exist, and where the classes they already fill contain so large a number as to permit many years to elapse without the possibility of putting them all on active duty, unless at the expense, inconvenience, and injury, of more frequent changes of the superior officers in stations and squadrons, than the public interests appear to justify.

The whole number of naval officers at this time including those under warrants as well as commissions, is about one thousand; and our whole annual expenses, of every kind, for their maintenance, is about \$850,000, or an average about \$850 for each officer. These expenses have not been increased during the last ten years, except what has been caused by the addition before mentioned to the numbers of some classes of officers, and the augmentation in pay in 1827 to passed midshipmen, in 1828 to surgeons and their assistants, and in 1830 to lieutenants. In the mean time, of late years, more useless officers have been placed on half pay, and some large



allowances reduced. But no further essential reductions in these particulars can, in my opinion, be effected without injury either to individual officers, or to the naval service. Whatever has been accomplished by myself on this subject, and on the requirement of a more equal portion of laborious duty from all officers of similar rank and date who were not invalids, has often caused to me much pain; but it has been prompted by a strong sense of the equal justice due to the officers themselves, and of the manifest propriety in this department of seeing that all those under its administration perform services for the public, when practicable, in some degree proportionate to the compensation they receive.

It is hoped that I may not be deemed importunate, if, once more urging on your attention a topic far more grateful to my feelings. I have long entertained a decided opinion that the compensation to some classes of officers ought to be increased. It is certain that more equal justice would be awarded to all, that services at sea could more easily be obtained, that greater cheerfulness and alacrity in the performance of duty would be evinced, and a higher grade of qualifications in some subordinate stations could be commanded, if the whole subject of pay was revised, and the compensation graduated in a fairer proportion among different ranks in the navy, and to similar ranks in the army; and if there was provision made for a larger and marked discrimination between duty afloat and leave of absence, or waiting orders, on shore. Such a discrimination formed a prominent feature in the act of Congress passed April 21st, 1806, and which regulates pay as now established. But that discrimination, amounting to one half of the whole pay, was virtually abolished by a rule of this department in 1819. During the continuance of the small compensation to some classes of officers, and after so long a practice under that rule, with the yearly sanction of Congress by means of the estimates and corresponding appropriations in conformity to the rule, I have not felt at liberty to alter it. Further details on this subject at this time are not deemed necessary, as they have fully and recently been laid before you in a special report from this department on a resolution of the Senate passed at the last session of Congress.

The whole number of seamen in the Navy, including all the different grades, does not vary much from five thousand; and the annual expenses of their pay, rations, and enlistment, are not far from \$1,130,000, or, on an average, about \$226 for each seaman. These expenses are small, and indicate great popularity in the service when we advert not only to our facility in obtaining good seamen, but to the high rate of wages the past year in merchant vessels, and to the great cost of this class of persons in the navies of some countries, where labor is generally much lower than in the United States. These expenses have not been increased the last ten years, except by an augmentation of about one-third in the whole number of seamen, arising chiefly from an increase of our force in commission. The complement of men to each vessel might advantageously in some respects be lessened, and the whole expenses on account of them be thus reduced, were it not considered of vital importance in so small a navy to have all our ships afloat as perfect as possible in every particular conducive to their efficiency, and to the reputation of the Government. It is expected that a laudable pride will then be felt and encouraged by all connected with the service, on a comparison of the condition of our own ships with those of other nations, and that the moral force of our navy—as a model for a larger one when wanted—as likely to vindicate its country's rights and honor in war, and protect its commerce in peace—will always be much greater with a small number of vessels afloat, built of the best materials and in the best manner, supplied with the most approved equipments, commanded by well educated and well disciplined officers, and navigated by full crews of hardy and contented seamen, with the whole ready on any emergency for immediate and efficient action—than with double the number of vessels half manned, and in other respects defectively provided. Every improvement in our materials, whether timber, cordage, or cannon—in our yards, docks, or harbors—in our hospitals or asylums—will add strength to this moral force, and better prepare us for any future conflict in which the violence or injustice of other nations may involve us.

In connexion with this part of the service, it is deemed proper to present some remarks concerning the condition of the Marine Corps. The subject of its allowances, in addition to pay, was not specially noticed by Congress the last year; though, in that way, it has of late been customary to regulate them. But, under a belief that the omission probably arose

from accident, I have not interfered to revise the difficulties which have so long existed under that head. It will, however, be considered my duty, the ensuing year, to investigate, and attempt to adjust them, if not otherwise provided for. The commutation of the whiskey part of the ration, while the marines are at sea, has been extended to this corps; and the army regulation, entirely abolishing that part, has been applied to their rations on shore.

The whole expenses of the corps, independent of the erection of barracks and officers' quarters, are yearly about \$190,000. The expenditures for such erections, on an average for the last ten years, have been about \$5,000, annually. The quarters authorized at Philadelphia have been completed; but the comfort and proper accommodation of the men require new barracks at New York. The estimates for this purpose, and for the support of this corps, are herewith submitted. (C, 1 & 2.)

The examination of the state of the pensioners upon the Navy Pension Fund, as those enjoying its privileges, have been, or now are, in the service, or were connected with those once in it, may also be deemed to come properly under the head of persons attached to the navy. Though the annual expenditures from that fund are about \$33,000, yet the fund itself did not spring from the public Treasury, except as derived from prizes captured by our public vessels. It was not till lately that its disbursements were classified with the navy expenditures; and now the only yearly expense this fund and its administration here impose on the Treasury, is the portion of time they occupy of the head of this department, and of one clerk. Its annual income now exceeds the annual expenses about \$20,000, and during the past year, rules have been prepared, and the benefits of this surplus extended, as originally contemplated by the act of Congress creating the fund, so as to embrace those officers and seamen who, without being wounded, have, during long and faithful services, been visited by infirmities entitling them to relief. Five persons, coming under this description, have been added to the pension list, and are allowed suitable clothing, food, and medical attendance. The number of pensioners under this and the other provisions, is 298.

The condition of the privateer pensioners, placed under the exclusive administration of this department, has not essentially changed during the year. The fund for their relief, like that for navy pensioners, does not come from the public Treasury, and its management is no charge upon that Treasury, except in the particulars before mentioned. As the whole of this fund was derived from captures by privateers, it has been deemed expedient to exhaust it in the support of those disabled, and of proper persons connected with those, whose bravery and enterprise made the captures. It has therefore become gradually reduced to \$44,667. The annual charge on it at this time is about \$3,000, exceeding considerably the annual income, and thus, in due time, carrying into effect the original policy of the system. For further particulars about these two funds reference can be had to the annexed statement. (D, 1 to 5.)

On a review of the entire personal branch of our naval establishment, it will be seen that its annual cost, not including the marine corps, is about \$2,000,000; and, of that sum, about \$1,964,000 is an annual charge on the public Treasury. Considering the size and usefulness of the whole naval establishment, it is believed that this part of it, at the present time, bears a judicious and economical proportion to the whole, except in the particulars heretofore enumerated. Should improvements be made in those particulars, I am satisfied that the number and compensation of the persons employed, both on the civil list and in the navy, will be found to be such as to ensure the due care and preservation of the public property, to furnish officers and men sufficient for the present protection of our commerce and rights abroad, and to maintain among all classes a state of discipline and activity indispensable to efficiency in the discharge of ordinary duties, and to a supply of suitable candidates for promotion in the extraordinary exigencies of the future.

The deaths, dismissals, and resignations, in the service since my last report, may be seen in the tables annexed. (E, F, G.)

When we advert to the other subjects connected with the navy, and more especially to what may be considered as belonging to its materials, it is deemed proper to notice first the employment and condition of our public vessels. Those in commission have consisted of one ship of the line, four frigates, eleven sloops, and seven schooners. They have been distributed, as usual, on four foreign stations, keeping up a greater intercourse than formerly with the western

coasts of Portugal and Africa, and with the adjacent islands; extending our cruises into various parts of the Indian ocean, and making the West India squadron act somewhat as a home squadron, by requiring a portion of it to visit twice annually some of our Atlantic ports. By properly regulating these visits, much exposure in the two most dangerous months in a tropical climate is avoided, and great facilities are obtained to furnish necessary supplies, to relieve parts of their crews and exchange officers, as well as to have nearer at hand, during those visits, vessels in commission, which, if any emergency should occur, may be despatched at once on any distant or important service. Efforts have been made to relieve seasonably all our vessels which have been more than two years abroad. The Fairfield and Vincennes have been sent to the Pacific to succeed the Potomac and Falmouth; the Natchez and Ontario, to the Brazilian station in place of the Lexington and Warren; the Experiment to the West Indies in place of the Shark; and the Shark and Delaware to the Mediterranean in place of the Concord, Boston, John Adams, and Brandywine. In making these changes so early as to prevent the expiration abroad of the service of our seamen, much discontent has been avoided, though this system has necessarily subjected the department to some additional expense, by having occasionally, for short periods, double sets of vessels afloat attached to the same station. But it has enabled us to perform our engagements faithfully with their crews, and to keep up a more regular and constant force on each station for protection. At the same time, caution has been taken to guard against an increase of our whole expenditures for the current year beyond the appropriations connected with this subject.

All those squadrons have been actively and efficiently employed; and it gives me great satisfaction to state, that our commerce in all quarters of the globe was probably never known to be more free from menaces, danger, or actual violence.

The estimates for the ensuing year are for the same amount of force as was authorized the past year, consisting of about 530 guns, and distributed in such a proportion among vessels of every class belonging to our service, as to combine the greatest efficiency for naval purposes during peace, with the soundest economy. Few will deem that force either too large or extravagant, when it is considered that our foreign commerce, exposed on the ocean, exceeds one hundred millions in imports, and almost an equal amount of exports, with vessels exposed in their transportation of over half a million in tonnage, and probably twenty millions in value; and when it is remembered how much the security, not only of those vessels and their cargoes, but of their numerous crews, and of other classes of our citizens resident in some countries abroad, depends on our navy being actively and widely distributed. On this point it may be well to reflect further, how safely that navy enables us not only to send to new and the most distant markets, and thus to give increased value to the surplus proceeds of our agriculture, manufactures, and fisheries, and to obtain in return whatever may conduce to comfort, improvement or wealth, but what protection and enhanced worth it confers on most of our immense coasting trade; how much our national reputation abroad is everywhere known and appreciated by it; the respect it inspires; the security it yields, and the weight it affords in all our claims of justice, and negotiations with semi-barbarous nations; and how justly it may be apprehended that new perils will, ere long, await a portion of our trade, and the tranquillity of a part of our maritime frontier, from the operations of a new course of legislation by some foreign powers concerning an unfortunate portion of their population; and against which perils, as well as against the ordinary aggressions and piracies in peace, and much of the depredations which may threaten us in war, the navy, from the insular situation of our country as to most of the world, must always be regarded as our great safeguard.

The facilities for examining and repairing of our vessels have been much increased the past year by the completion, in most respects, of the two dry docks, and the expenses in refitting the classes of larger vessels will thereby become sensibly reduced.

The present policy of this department is to launch no more vessels of the same size with those in ordinary, until the latter are worn out. But it is proposed to build from time to time, and protect on the stocks till wanted, such new vessels as Congress may authorize to be constructed; because, in that condition, their timber will improve rather than decay, and the expense of taking care of them will be trifling compared with that of vessels in ordinary. This course has been adopted the past year with the Macedonian, now building. It is recommended, as



sound policy, that authority should be given to procure the frame for another sloop, to be called the *Levant*, after the consort so gallantly captured with the *Cyane*; and the frame for another frigate, to be called the *Paul Jones*, in grateful memory of one of the earliest, bravest, and most distinguished commanders in our naval service during the revolution. The estimates for the purchase of these are submitted. (H.) Frames could not be bought for vessels of these names under any existing laws; and the timber, if procured and seasoned, whether soon set up or not, would become more valuable, being sheltered under either our present excellent sheds or ship-houses, and live oak, probably becoming scarcer and dearer as our southern frontier is cleared for cultivation.

The vessels in ordinary and on the stocks, as well as the frames for others in dépôt, have all been examined, and found to be in a good state of preservation, except a few of those in ordinary. Some of them are defective by their long continuance afloat before being covered, some by their great age, and some by the original imperfection of their timber. Those unworthy of being refitted are used at times for receiving ships; and the rest, as wanted, are placed in proper state to go into commission for the relief of other vessels returning from long cruises, and needing extensive repairs. As vessels afloat grow older, their repairs must of necessity become more expensive. The cost of all repairs of all our vessels the past year has been about \$580,000. During the last ten years, the repairs have been, on an average, about \$500,000 annually.

A table showing the vessels in commission, with their commanders and stations, is submitted. (I.) The names and condition of those in ordinary and on the stocks, may be seen in the documents annexed (K, 1 and 2). Proceeding from the vessels to the materials used in their construction and equipment, not much has occurred the past year deserving notice. Some additions of valuable and durable articles have been made to our various stores on hand at the time of my last annual report. All these stores, and especially the timber in the docks and under sheds, are in good condition; and means have been taken to ascertain and supply any deficiency, in any article not perishable, which may be wanted for the building and perfect equipment of every vessel on the stocks, and every frame in dépôt. As more timber may be needed, or thought proper to be purchased in advance, our means for the supply of live oak, it being the most important species, have been fully investigated and discussed in a special report to Congress from this department during the last session. Referring to that for detailed information on this point, I would only add, that subsequent examinations in some of the then unfinished districts have fully confirmed the impressions entertained concerning the great quantity of live oak timber on portions of the public lands in those districts. In respect to the other kinds of timber needed in ship building, the Government has made little public provision; and doubts exist whether it will be necessary to make any further public provision for its growth or preservation while the prices continue so moderate, and the resources of the country in such timber are likely, for many years, to remain so very abundant.

The erection of two new magazines, where none before existed, is proposed the next season; and an estimate for that purpose is submitted. (L.) Connected with this, a thorough inspection has been made not only of our present ordnance stores, but, as previously mentioned, of all our arms on hand, with a view to the sale of such as is defective or unsuitable, and to the procurement of what may be found necessary to produce uniformity, and the greatest power, in our future armaments. The usual sum of about \$10,000 has been expended for the purchase of such ordnance and ordnance stores as the current wants of the service required. The buying and manufacture of iron tanks for all our vessels in commission are in rapid progress under the late appropriation for that purpose; and should Congress sanction the making of our own cordage as heretofore asked, and as now again proposed in the general estimates, the equipment of our vessels would soon become, throughout, all which the friends of the service could desire, for health, safety, efficiency, and national reputation.

After much deliberation, the department has become convinced that the building or purchase of two store-ships for the Pacific station, to be used in the transportation and the preservation there of supplies of all kinds, would promote sound economy, and increase the comforts of our seamen. An estimate for the procurement of one the ensuing year is sub-

mitted. (M.) We are obliged to pay freight for these supplies, heavy duties either on their being landed or re-shipped, and large rent for store-houses. The duties are a burden from which we are almost entirely exonerated under similar circumstances in other quarters of the world. The proposed measure would relieve us from them as well as the other charges; and the store-ships, by going out and returning separately and alternately, would afford great facilities to exchange or bring home invalid officers and seamen, without incurring the expense of their passages in merchant vessels from so distant a station.

The construction of two or three small steam batteries, for reasons heretofore recommended, is still deemed highly important to our future interests; and too long delay in making further experiments, and in acquiring further science on this subject in our naval service, may, on the sudden occurrence of hostilities, place us in a position not a little mortifying to our pride, and hazardous to our welfare.

The different navy yards are essential portions of our naval establishment, connected with its materials. The condition of most of them has been improved the past year either by new buildings for officers' quarters, or new store-houses and timber sheds, or new wharves and other conveniences.

The two dry docks at the yards near Norfolk and Boston, having been successfully completed in all essential particulars, the details on that subject will be found in the report annexed, (N, 1, 2, and 3.) This report shows the whole expenditures the last year not only on that subject, but on all others, under the head of gradual improvement. From the great advantages already realized in the ease and rapidity of repairs in vessels at the yards where these dry docks are situated, I am satisfied that others would be found very beneficial. Surveys were formerly had for two more—one at New-York, and one at Portsmouth—and a report in favor of those two was once made and approved in the House of Representatives. Much can be urged in favor of the former place on account of its central position, and great resources for repairs, stores, seamen, and workmen; and of the latter place, on account of the low price of labor, small cost of constructing a dock, and the easy access to it by vessels of all classes at all seasons of the year. But whether one or both, or neither, shall be selected at this time, is submitted to the proper authorities on a review of the whole subject. It must be obvious that the relative importance of different stations must undergo changes, as the capacities of different quarters of the country become more fully developed; and that some places, now employed as naval depôts, can be of very little use on the occurrence of war, while the position of others, when that event may happen, will greatly increase their usefulness.

Among the new places which, on such occasion, if not earlier, the interests of the country may require the Government to occupy for naval purposes, will undoubtedly be Newport harbor on the north, and one or more positions on the long range of coast to the South between Norfolk and Pensacola. Whether the last select on should be made near Charleston or Savannah, at Key West or the Dry Tortugas—each of which possesses advantages for such purposes—can be better decided when the time and circumstances occur rendering immediate action necessary.

The continuance of Pensacola as a naval station seems to me judicious. This opinion arises not only from its convenient position as to the whole Gulf of Mexico, but its proximity to the mouths of the Mississippi, and Mobile rivers, whose great and growing commerce is so amply entitled to the best protection. In the depth and size of its bay, in the excellent defences of its mouth, in its healthy situation, in its easy access to all our vessels, except of the two highest classes, Pensacola has no prominent rival in that neighborhood. The correspondence and documents annexed (O, 1 and 2) are submitted to aid yourself and Congress to judge of the practicability and propriety of deepening the entrance of the bay, so as to admit vessels of the largest class. This, it is supposed, can be effected at a small expense, compared with the importance of such a measure to the full operations of our navy on that coast, and to the greater security and strength of our southern maritime defences.

The exchange of lands at the yard near New York, authorized at the last session of Congress, has been carried into effect. The controverted claim of the heirs of Mr. Harris to a part of the navy yard near Boston, has once been laid before Congress; and a new action having been instituted by them against

the commander of that station, as will be seen by the letter annexed, such course will be pursued in its defence as Congress may be pleased to direct. (P.)

Some new pretensions have been set up to different parcels of land included in our possession and purchases at Norfolk; but their justice cannot be recognized on the facts known to the department, and those making them have been informed that no steps can be taken for their adjustment, unless the parties previously obtain the sanction of Congress, or a judgment in their favor by the courts of law.

The expenditures on all the yards the last year, exclusive of the dry docks, but including houses, sheds, stores, wharves, enclosures, workshops, marine barracks, and incidental labor, have been about \$360,000. The expenditures on the dry docks are chargeable to a distinct appropriation for gradual improvement, and were about \$180,000. The other expenditures under the last head were about one hundred and fifty thousand dollars. (N, 1.) The estimates for the usual objects at the yards the ensuing year are about the average amount for the last two years. Besides those objects, they include an extra sum towards the erection of rope-walks, in conformity with the plan adopted by Congress in 1827; and yet the whole amount requested towards these and all other improvements, at all the yards, is only \$354,000.

Immediately connected with the subject of our yards, is that of our naval hospitals, and naval asylum. Under the appropriations lately made by Congress, new hospitals have been commenced near Pensacola, New York, and Boston, on retired and healthy sites, combining great convenience and beauty. The plans of these have been formed on a scale suited only to the present wants of the service, but capable of easy and appropriate enlargement hereafter, whenever our necessities may require it. An additional sum will be needed to finish them in the manner proposed, and to make further progress in the hospital before built at Norfolk. (Q.)

Such expenditures have been made the past year on the latter, from the general hospital fund, as could well be spared, and as the comforts of its inmates seemed most urgently to demand. This is much larger than our present necessities require; and, therefore, it is not proposed to finish the whole interior of it. But the exterior of this hospital is now chiefly completed, and it has become one of the most beautiful and useful public buildings belonging to the Government. The naval asylum at Philadelphia has been finished and partly furnished; but it is much regretted that the department has not been able to obtain a cession of jurisdiction over it, without reservations that render the cession wholly nugatory. Besides retaining the usual power in the State to execute criminal and civil process, the reservations subject it to, and it is actually burdened by, the assessment of large taxes which are paid from the hard earnings of our seamen, and an unlimited right is retained to cut up the property by new streets. Further efforts are now making by the department to obtain relief from these onerous taxes and liabilities, so disadvantageous, if not fatal, to the success of this public and charitable institution. Should these efforts fail, all the correspondence and documents in the case will be submitted, in order that such legislation may be had as the whole circumstances connected with the subject shall be thought to require. The general condition of the hospital fund may be seen in the statement before referred to. (D, 6.)

The ordinary purchases of medicines and surgical instruments for use in hospitals and yards, and in vessels afloat, are included under a specific appropriation, and are about \$35,000 yearly. The pay and subsistence of the surgeons and assistant surgeons attached to the hospitals are provided for under the general appropriation for navy officers. The other annual expenses of our hospital establishment, independent of buildings, furniture, and repairs, are about \$1,000. These are defrayed wholly from assessments on the seamen and officers. From the same quarter come all other resources for the establishment, with the exception of such appropriations as Congress have made from time to time to aid in erecting and furnishing buildings. These last appropriations have been made but seldom, and have, within ten years, amounted to a sum which would be, on an average, about \$22,150 annually; and for the same purposes, during that period, the fund has furnished, from its annual increase and former accumulations, about forty two thousand annually. Should Congress grant what is now asked, more will probably not be wanted for many years. In immediate connexion with the yards



hospitals, and other real estate belonging to our naval establishment, is the live oak plantation. Being situated only seven miles from our most southern yard, it has the past year been placed under the same general superintendence. The purchase of the land, and the cutting and removal of the underwood and common timber for about 200 acres of the plantation had been accomplished before the charge of this department was placed in my hands. It seemed to me judicious in that state of things to attempt to preserve any benefits already attained, or fairly anticipated, by continuing to destroy a few years longer the annual growth of other wood injurious to the young live oak trees, to trim and train the thickest new ones appearing, and to employ merely the leisure of the hands so engaged in extending this process to more of the land. From 200 acres of land, and 22,000 live oak trees to which, in 1829, the above system had been applied, it has, since 1831, been so continued and extended, that the nursery has become enlarged to 235 acres, and includes over 60,000 trees. The expense attending this has been about \$1,200 a year: but should any considerable portion of the trees ever reach maturity, and attain a size suitable for ship building, the Government will be amply repaid. As the trees grew larger, the annual expense concerning the same number will rapidly diminish. Doubts exist whether some of them, from the poverty of the soil, and their apparently dwarfish character, will ever attain a valuable size. But it is now too early for forming a decisive opinion on the extent to which the operation of these causes may affect the whole plantation, and, under existing circumstances, sound policy appears to require that the experiment, having gone so far, should be allowed a further and full trial. The nearness of the plantation to the Pensacola yard and to water transportation, enhances much the value of any timber it may produce. Lately, I have not only placed this land under the general superintendence of the commander of that yard, but required his particular and constant vigilance over the live oak reservations in all that region of country. The whole agencies heretofore connected with our live oak, have, as before suggested, been discontinued; all the districts, except small portions of two, having been explored as fully as is deemed useful till the surveys of the land into townships and sections shall be completed. As fast as they may be completed, arrangements have been made for additional reservations of public land on which live oak has been ascertained to abound, and the prospect of a sufficient supply of that kind of timber in future is flattering, if that on private lands, as these are wanted to be cleared for cultivation, be from time to time purchased at moderate prices, and placed in depot for the frames of vessels specially authorized or collected under the head of gradual improvement. On the whole subject I have so recently, and at such length, submitted to Congress the views of this department, that further observations here are not deemed necessary. (See report on live oak to House of Representatives, December 14, 1832.)

Some miscellaneous matters connected with the navy deserve a brief notice. The usual attention has been bestowed on the suppression of the slave trade. The colony of Liberia has been visited by the schooner Porpoise while in pursuit of a piratical vessel, and which vessel, it is gratifying to add, is supposed to have been since captured by a British brig, and her criminal career terminated near the island of St. Thomas, on the coast of Africa. One half of the usual appropriation on the subject of the slave trade will probably be sufficient for the ensuing year, as may be seen by the state of the account herewith submitted. (R)

The renewal of an appropriation for the relief of Alexander Claxton, made in May, 1830, has become necessary, in consequence of its having been transferred to the surplus fund before all the persons entitled to it were able to procure the necessary vouchers.

The proceedings of the board appointed, under a resolution of Congress, to revise the naval regulations, will be soon remitted in a separate report.

The survey of our sea coast having been placed in charge of the Treasury Department, it is not in my power, officially, to state its progress; but officers have been detailed, and all available facilities provided, whenever the wishes of those superintending the subject have been communicated.

Some expenses, under the contingent appropriation for enumerated objects, have not been included under any of the amounts already mentioned, but they belong to courts martial, to pilotage of vessels, to transportation of materials, to the purchase of

charts and books, and various other small items, forming an aggregate of about \$80,000.

On a review of the whole affairs of this department it appears that its expenditures on all naval subjects, the past year, have been somewhat less than four millions of dollars. It will be seen how this result compares with former periods, by adverting to the fact that, during the last twenty years, these expenditures, except during five years of that time, have never fallen so low as three millions; and, except during six years of that time, have never exceeded four millions.

The whole estimates made the past year, for the general wants of what is technically considered the navy, were only \$3,176,766. Those for the year previous were \$3,227,383. Those for the present year are \$3,292,224, (\$1 to 8.) But it is to be remembered that, under the head of naval expenditures, besides what is paid from the amount voted on the annual naval estimates, it is customary to class what is paid from half a million appropriated for a term of years to gradual improvement almost \$200,000 for the marine corps; the payments from the navy pension, hospital, and privateer pension funds, and several miscellaneous sums voted by Congress on motions, resolutions, and petitions; and part of which sums, though charged under this head, have little or no concern with our naval establishment. On the contrary, some of the expenses connected with the administration of the department, at this place, are included in the general appropriation bills for the support of Government, and are not usually classed under the head of naval expenditures.

It is a high gratification to be able to state that, since 1827, nearly half a million a year has been disbursed for gradual improvement; that within ten years a larger number than formerly of seamen and officers, with increased pay to four classes of the latter, have been maintained; very great and valuable improvements, besides the dry docks, have been begun and accomplished at many of the yards, and our force in commission considerably augmented; and yet that all our ordinary naval expenditures are, and probably can be kept, within four million of dollars annually.

The smaller appropriations originally made for the navy served to maintain the few officers and seamen then employed, and supplied us with several fine vessels, four of which are still in existence. The subsequent appropriations on a more extended scale, besides supporting the current expenses of our force in its infancy, furnished the purchase money for most of our present yards, and defrayed the expenses of brilliant hostilities with France, and afterwards with Tripoli; till a few years of comparative inactivity, having ensued, the commencement and progress of the last war with England led to a great addition to the naval establishment, and to expenditures much larger than at present. The liberal appropriations that were continued for some years after that war, aided in laying a good foundation for the gradual increase of the navy, and helped to build not only many of the vessels now in commission and ordinary, but most of those upon the stocks. The appropriations for some years past have been similar in amount, and have enabled the department to enlarge its policy, and widen the sphere of its operations. Besides building some additional vessels, and defraying all the current expenses of an increased force both personal and material, it has been able to erect hospitals to construct dry docks, to improve, greatly, the old yards, to add and maintain a new one on our southern frontier, and to collect in depot a large amount of valuable stores as a part of the due preparation in peace for the various contingencies of war. With a careful regard to system and economy, and with strict accountability in agents and officers, this policy can long be pursued and extended without making the ordinary annual demands for this branch of the service often exceed four millions; and if, without essential changes by Congress, increasing our present expenses, and without any unforeseen and extraordinary wants, our fiscal operations can usually be confined within that amount yearly, it is confidently hoped the naval establishment will not be considered wasteful or burdensome beyond its benefits to the country.

In disbursing between three and four millions the past year, it is not known that a single instance of any loss has occurred.

The balances on hand, unexpended, are about \$1,000,000; but most of them will probably be wanted to close the different accounts, on all the different subjects, when finally adjusted.

Connected with our financial concerns, is one other circumstance of urgent importance. The period of

time at which the annual appropriations for this branch of the service are usually made, is a source of great inconvenience and injury.

The estimates and appropriations are known generally not to extend beyond the current year. Consequently, it happens that, after the 1st of January, there is nothing on hand under some heads to meet the daily demands of the service, amounting, on an average, to \$10,000 per day, unless a new appropriation has been made, or there happen to be some balances of the former year not called for. Under some heads, such balances always exist, because some disbursements, by means of absence, distance, and other causes, are not completed within the year. But they seldom exist under other important heads; and ought not to, if the accounts are seasonably settled, and the estimates were accurate, and the appropriations, as is usual, conformed to the estimates. The power now vested in the President to transfer a balance from one portion to another, is confined to certain classes of claims small in amount; as to all others, no transfer can legally be made, and if no balance remain at the end of the year, and the new naval appropriation bills have not passed, payment is entirely stopped, or the whole operations of this department dependant on them are suspended. Considering how large a part of these operations, and of our expenditures, necessarily takes place in distant quarters of the world, it will be seen that the embarrassment in this branch of the service must often be peculiar and aggravated. In the case of bills of exchange drawn abroad, chargeable to appropriations already exhausted, the public faith, under the above circumstances, is sometimes in danger of being violated; our credit in foreign countries becomes injured; and the Treasury, as actually happened during the last winter, is exposed to large losses if the holders choose to resort to protests and claims for the mercantile rate of damages.

Under the present system of passing so late the naval appropriation bills, it happens that, unless money voted under one head is, without authority, as was once the practice, applied under other heads, this unfortunate condition continues every short session of Congress about two months, and every long session about four months. It can easily be remedied by two methods: One of them is, to make, previous to the 1st of January, new appropriations for a quarter or half of the year towards all permanent objects. By limiting them to such a time, and to such objects, and by taking the estimates of the former year as a guide, no inconvenience will interpose, and no error can occur which may not be readily corrected when the residue of the appropriations for the whole year is voted at a later period in the session. Another mode is, to authorize the President to make necessary transfers from one head to another in all cases where the new naval appropriation bill do not pass by the commencement of the year, and to require from him a report to Congress of the amount and causes of such transfers. If the authority be thus restricted, it is difficult to discover any danger likely to result from its exercise; and it is believed that the surplus of balances on hand under some of the appropriations would usually prove sufficient to supply the wants under others. The detail and earnestness with which legislation on this subject is now urged, must find their excuse in my strong conviction that no measure whatever, requiring like this no increased expenditures could be more conducive to the reputation and efficient operations of our naval establishment.

Thus, sir, under an examination of its central administration, of its personal, or civil and navy list, of its materials, with its appurtenances thereto, and of its miscellaneous concerns, I have submitted a review of all its transactions and expenditures during the past year that possess any great degree of importance. This has been accompanied by suggestions for such improvements as observation and reflection have convinced me might be useful; and should they meet with the approbation of yourself and Congress, I look forward with confidence to a long continuance of prosperity in the affairs connected with this department.

With great respect, yours, &c.,  
LUKE WOODBURY.



## REPORT OF THE POSTMASTER GENERAL.

GENERAL POST OFFICE DEPARTMENT,  
November 30, 1833.

To the President of the United States:

Sir: When, in 1829, the functions of this Department devolved upon me, the annual transportation of the mail amounted to \$13,700,000. The contracts then in existence, with the other expenses of the Department, had, within the year ending the 30th June, 1829, diminished its surplus revenue \$101,266 03, and those contracts were still in force from one to four years in prospect.

The surplus available revenue had been reduced to the nominal amount of \$230,849 07

But it has subsequently been ascertained, that there had been expenses incurred for transportation performed prior to the 1st of July, 1829, which were not embraced in that account, to the amount of \$64,248 76

Which reduced the real surplus to \$166,600 31

The annual transportation of the mail was, on the 1st July, 1833, 26,854,485 miles.

The annual amount of the transportation of the mail in stages and steamboats, on the 1st of July, 1829, was 6,507,818 miles.

The annual amount of the transportation of the mail in stages and steamboats, on the 1st of July, 1833, was 18,322,576 miles.

The expense of transporting the mail for the year ending 30th June, 1829, was \$1,153,646 21.

The expense of transporting the mail for the year ending 30th June 1833, was \$1,894,688 08.

The gross amount of postages, constituting the revenues of the Department, was, for the year ending 30th June, 1829, \$1,707,418 42.

The gross amount of postages for the year ending 30th June, 1833, was \$2,616,538 27.

The incidental expenses of the Department for the year ending 30th June, 1829, amounted to \$69,249 08.

The incidental expenses of the Department for the year ending 30th June, 1833, amounted to \$87,701 61.

The number of post offices in the United States on the 1st of July, 1829, was 8,004.

On the 1st of July, 1833, the number of post offices in the United States was 10,127.

The increase of the annual transportation of the mail within the four years ending on the 30th June, 1833, is 13,154,485 miles; nearly equal to the whole amount of transportation in 1829.

The increase of the annual amount of postages within the same period, is \$909,119 85, and the whole amount is more than the double of what it was in 1829.

The average expense of transporting the mail in 1829, was eight cents and four-tenths of a cent per mile.

The average expense of transporting the mail in 1833, is seven cents and fifty-seven hundredths of a cent per mile; making a difference in the rate per mile, of eighty-three hundredths of a cent, equal, for the whole service, to \$222,892 22 per year less, in proportion to the service performed, than the expense of transportation in 1829, besides a great increase in expedition between the principal commercial cities, and a much greater proportion of the whole performed in stages.

After carrying into effect the law of the last Congress establishing new mail routes, the present length of mail roads in the United States, amounts to 119,916 miles, viz:

	Miles.		Miles.
In Maine,	3,824	In Florida,	1,131
N. Hampshire,	2,460	Alabama,	4,433
Vermont,	2,531	Mississippi,	2,462
Massachusetts,	4,845	Louisiana,	1,462
Rhode Island,	491	Arkansas,	2,309
Connecticut,	2,701	Tennessee,	6,761
New York,	13,256	Kentucky,	5,993
New Jersey,	1,961	Ohio,	8,977
Pennsylvania,	11,010	Michigan,	1,495
Delaware,	494	Indiana,	5,361
Maryland,	2,102	Illinois,	4,459
Virginia,	10,588	Missouri,	2,170
N. Carolina,	6,850		
S. Carolina,	4,516	Making	
Georgia,	5,274	together	119,916

Over these roads, the annual transportation of the mail on the first of July last, was,

	In stages.	In steamboats.	On horseback and in sulkies.	Total.
	Miles.	Miles.	Miles.	Miles.
In Maine.....	708,164	3,399	978,529	
New Hampshire.....	602,328		111,854	734,009

Vermont.....	634,666	106,260	740,926
Massachusetts.....	1,573,610	150,037	1,737,389
Rhode Island.....	117,968	16,692	134,660
Connecticut.....	598,987	17,376	716,008
New York.....	3,063,539	183,339	3,246,878
New Jersey.....	548,359	854,937	1,403,296
Pennsylvania.....	2,414,800	100,840	2,515,640
Delaware.....	92,674	762,873	855,547
Maryland.....	385,792	17,264	403,056
Virginia.....	1,277,846	161,568	1,439,414
North Carolina.....	829,415	68,500	897,915
South Carolina.....	658,534	427,076	1,085,610
Georgia.....	368,019	275,548	643,567
Florida.....	47,113	408,626	455,739
Alabama.....	429,078	86,612	515,690
Mississippi.....	78,002	353,632	431,634
Louisiana.....	48,516	282,756	331,272
Arkansas.....		156,076	156,076
Tennessee.....	513,453	231,556	745,009
Kentucky.....	628,073	502,320	1,130,393
Ohio.....	1,216,801	540,240	1,757,041
Michigan.....	144,952	618,190	763,142
Indiana.....	196,268	89,512	285,780
Illinois.....	236,522	487,814	724,336
Missouri.....	79,508	293,278	372,786
Total.....	17,693,839	628,737	18,322,576

The increase of transportation from the 1st July, 1832, to the 1st July, 1833, has been,

In stages,	1,471,096 miles.
In steamboats,	129,436 "
On horseback and in sulkies,	1,628,932 "
Making together,	3,229,464 "

The method in which the accounts of the expenses of transporting the mail have always been kept in this department, has led to a misapprehension of the means of extending improvements in mail facilities. It appears, from the earliest records of the department, to have been a rule not to enter to the credit of a contractor, nor to charge to the account of transportation, the expense of carrying the mail on his route, till after he had signed his contract and bond, and returned them to the department with proper security, though the service may have been regularly performed, and, in many instances, the moneys actually paid. It has sometimes happened that contracts of the greatest magnitude have, from various causes, remained for more than a year unreturned. In such cases, though the expenses have been incurred, they do not appear in the transportation account, and though the moneys have been paid to the contractors, they stand on the books as balances to that amount due from them to the department, constituting a part of its surplus fund; when, in fact, they constitute a part of the actual expense incurred for the transportation of the mail. The consequence has been, that the expenses for transporting the mail within any given period of time, as shown in the accounts, and reported annually through the Executive, have been always calculated to exhibit an amount considerably less than what has actually been incurred. This is an imperfection not of recent origin, but one which appears to have been co-existent with the department. When the number of contracts was few, and the surplus revenue bore a large ratio to its whole annual amount, the effect was unimportant; but in the increased number of mail routes, and the diminution of its surplus revenue, it was calculated to produce serious inconvenience. From the statements growing out of this system, thus illusory in their results, together with the great expense of carrying into effect the law of the last Congress establishing new mail routes, and a disposition to gratify the wishes of the public in the improvement of mail facilities, I was led to carry those improvements to an extent which it was found the resources of the department would not well sustain. When the inconvenience was felt, the cause was carefully investigated, and the following result was disclosed. Prompt directions were given for the correction of the error in future. It is not possible to determine, to an exact certainty, the whole expense incurred for transportation within any recent period; because it will often happen that improvements will become necessary, even for the fulfilment of existing laws, the expenses of which, for want of proper evidence, must be reserved for subsequent adjustment, and so come into the account for a later period than that in which the services were performed. But these variations are of an inconsiderable amount compared with the differences resulting from the system heretofore observed.

On the 30th of June, 1829, which was the close of the first quarter in which I had assumed the functions of the department, the expenses which had been incurred for transporting the mail were \$64,248 76 more than the amount stated in my report to that day.

On the 1st day of July, 1832, the day to which my last report reaches, there was stated to be a

surplus of available funds, after defraying all the expenses of the department up to that day, of \$202,811 40

It is, however, now ascertained, that the expenses incurred for transportation which had actually been performed prior to the 1st July, 1832, beyond the amount stated in that report, were 205,656 07

So that instead of a surplus on that day, the department was actually indebted on the 1st day of July, 1832, beyond the whole amount of its available funds, admitting that no losses of postages should be sustained 2,844 67

The gross amount of postages for the year ending the 30th June, 1832, was 2,258,570 17

The gross amount of postages for the year ending the 30th June, 1833, was 2,616,538 27

Making an increase for the year over the former year of \$357,968 10

The net proceeds of postages, after deducting commissions to postmasters and the contingent expenses of their offices, for the year ending the 30th June, 1832, was \$1,543,098 49

For the year ending June 30, 1833, it was 1,790,254 65

Making an increase of net proceeds for the year, of \$247,156 16

The expenses of the Department, incurred for the year ending June 30, 1833, were as follows, viz:

Compensation to postmasters, including the contingent expenses of their offices—	
3d quarter, 1832,	\$202,431 26
4th quarter, "	200,151 51
1st quarter, 1833,	214,935 50
2d quarter, "	208,765 35
	\$826,283 62

Transportation of the mail—	
3d quarter, 1832,	435,892 95
4th quarter, "	441,183 01
1st quarter, 1833,	499,185 96
2d quarter, "	518,426 16
	1,894,688 08

Incidental expenses for the year, 87,701 61

Making together, \$2,808,673 31

The gross amount of postages for the same period was—	
3d quarter, 1832,	642,689 22
4th quarter, "	630,464 47
1st quarter, 1833,	673,957 67
2d quarter, "	669,426 91
	2,616,538 27

Leaving a deficit of 192,135 04

Add this sum paid into the Treasury by irregular deposits, having been placed by the receiving officer to the credit of that department instead of this, 228 69

The balance due by the department on the 1st July, 1832, as above stated, 2,844 67

And the department was indebted on the 1st July, 1833, beyond the amount of available balances due to it, in the sum of \$195,208 40

The annual expense of transporting the mail under existing contracts, with all their improvements, is \$2,033,289 42

The incidental expenses of the department, estimated at 90,000 00

Making the aggregate expense for a year, \$2,123,289 42

The net proceeds of postages for the year ending the 30th June, 1833, amounted to \$1,790,254 65

The net increase for that year over the preceding year, and which may be safely estimated as continuing was \$247,156 16



Making the nett revenue for the current year, \$2,037,410 81

Leaving a deficit of \$85,878 61

The former method of keeping the accounts of the expenses of transportation would have left out of this report expenses for transportation, as if they had not been incurred, because not entered under their proper dates, the sum of \$91,658 82, viz:

For services performed prior to July, 1, 1832, \$22,294 44  
For services performed during 3d quarter, 1832, 9,420 50  
4th quarter, 1832, 9,932 21  
1st quarter, 1833, 22,872 70  
2d quarter, 1833, 27,138 97

Making together, \$91,658 82

This, had the imperfection of that system remained unobserved, would have made the Department appear to be less indebted, by that amount, than what it is in reality.

The discovery of the excess of expenditures beyond its revenues, at once showed the necessity of retrenchment. The only practicable means of doing this, was the withdrawal of some of the improvements which had been made, and on such routes as would be least injurious to the public, and least prejudicial to the revenues of the Department.

This has been done with great care and attention to these two points. The reductions have been directed on the transportation to take effect from the 1st of January next, to the annual amount of \$902,370

The contracts have been renewed for the southwestern section, comprising the States of Louisiana, Mississippi, Alabama, Tennessee, Missouri, Illinois, and Indiana, and the Territory of Arkansas, with a greater amount of improvements than curtails, at an annual saving of 71,893

Making together an annual retrenchment in the expenses of the Department, of \$274,263

In making these retrenchments, many of the principal contractors who were to be affected by them, seeing the necessity which induced the measure, have readily declared their cordial acquiescence in it; and, with a patriotic spirit becoming their character, have shown a determination to sustain the Department, as a paramount object, at any sacrifices which it may require on their part.

After the reductions shall take effect, the annual transportation of the mail will still be 25,527,957 miles, viz:

	In stages.	In steam boats.	Horse-back and sulkeys.	Total.
In Maine.....	635,402	3,322	271,274	910,004
New Hampshire.....	624,226		111,854	736,080
Vermont.....	636,122		104,076	740,198
Massachusetts.....	1,553,248	93,712	145,220	1,792,180
Rhode Island.....	117,988		16,692	134,680
Connecticut.....	587,739	17,376	175,608	780,723
New York.....	2,982,634	155,339	884,820	4,022,806
New Jersey.....	517,854		100,840	618,694
Pennsylvania.....	2,060,990		764,329	2,825,319
Delaware.....	104,010		17,364	121,374
Maryland.....	570,796	58,380	161,588	790,664
Virginia.....	1,044,246	46,900	778,906	1,870,052
North Carolina.....	733,423	15,288	413,660	1,162,371
South Carolina.....	602,256		275,548	877,804
Georgia.....	278,024		498,626	776,650
Florida.....	47,119	41,606	86,612	175,324
Alabama.....	429,978	96,300	353,632	879,910
Mississippi.....	78,002		262,756	340,758
Louisiana.....	43,516	15,704	156,676	225,896
Arkansas.....			231,556	231,556
Tennessee.....	513,432		502,320	1,015,752
Kentucky.....	586,932	45,000	526,824	1,158,756
Ohio.....	1,005,360	47,150	617,358	1,669,868
Michigan.....	112,088		97,416	209,504
Indiana.....	196,268	21,000	487,814	705,082
Illinois.....	236,522		293,278	529,800
Missouri.....	79,503		184,184	263,687
Total.....	16,400,651	587,137	8,540,160	25,527,957

Thus, it will appear, that but a part of the improvements will be withdrawn, to enable the Department still to rely exclusively on its own resources, as the annual transportation will still be, after the 1st January next, 1,902,936 miles more than it was on the 1st July, 1832.

I have the honor to be, very respectfully, your obedient servant, W. T. BARRY.

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I have found that thy patterns for the levels and compasses have been preferred by my assistants generally, to any others in use, and the Improved Compass is superior to any other description of Goniometer that we have yet tried in laying the rails on this Road.

This instrument, more recently improved with a reversing telescope, in place of the vane sight, leaves the engineer scarcely any thing to desire in the formation or convenience of the Compass. It is indeed the most completely adapted to later angles of any simple and cheap instrument that I have yet seen, and I cannot but believe it will be preferred to all others now in use for laying of rails—and in fact, when known, I think it will be as highly appreciated for common surveying.

Respectfully thy friend, JAMES P. STABLER, Superintendent of Construction of Baltimore and Ohio Railroad.

Philadelphia, February, 1833.

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E. H. GILL, Civil Engineer. Germantown, February, 1833.

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For proof of the high estimation on which their Surveying Instruments are held, they respectfully beg leave to tender to the public perusal, the following certificates from gentlemen of distinguished scientific attainments.

To Ewing & Heartt.—Agreeably to your request made some months since, I now offer you my opinion of the Instruments made at your establishment, for the Baltimore and Ohio Railroad Company. This opinion would have been given at a much earlier period, but was intentionally delayed, in order to afford a longer time for the trial of the Instruments, so that I could speak with the greater confidence of their merits, if such cases should be found to possess.

It is with much pleasure I can now state that notwithstanding the Instruments in the service procured from your northern cities are considered good, I have a decided preference for those manufactured by you. Of the whole number manufactured for the Department of Construction, to wit: five Levels, and five of the Compasses, not one has required any repairs within the last twelve months, except from the occasional imperfection of a screw, or from accidents, to which all Instruments are liable. They possess a firmness and stability, and at the same time a neatness and beauty of execution, which reflect much credit on the artists engaged in their construction.

I can with confidence recommend them as being worthy the notice of Companies engaged in Internal Improvements, who may require Instruments of superior workmanship.

JAMES P. STABLER, Superintendent of Construction of the Baltimore and Ohio Railroad.

I have examined with care several Engineers' Instruments of your Manufacture, particularly Spirit Levels, and Surveyors' Compasses; and take pleasure in expressing my opinion of the excellence of the workmanship. The parts of the levels appeared well proportioned to secure facility in use, and accuracy and permanency in adjustments.

These instruments seemed to me to possess all the modern improvement of construction, of which so many have been made within these few years; and I have no doubt but they will give every satisfaction when used in the field.

WILLIAM HOWARD, U. S. Civil Engineer.

Baltimore, May 1st, 1833.

To Messrs Ewing and Heartt.—As you have asked me to give my opinion of the merits of those Instruments of your manufacture which I have either used or examined, I cheerfully state that as far as my opportunities of my becoming acquainted with their qualities have gone, I have great reason to think well of the skill displayed in their construction. The neatness of their workmanship has been the subject of frequent remark by myself, and of the accuracy of their performance I have received satisfactory assurance from others, whose opinion I respect, and who have had them for a considerable time in use. The efforts you have made since your establishment in this city, to relieve us of the necessity of sending elsewhere for what we may want in our line, deserves the unqualified approbation and our warm encouragement. Wishing you all the success which your enterprise so well merits, I remain, yours, &c.

A. H. LATROBE, Civil Engineer in the service of the Baltimore and Ohio Railroad Company.

A number of other letters are in our possession and might be introduced, but are too lengthy. We should be happy to submit them upon application, to any persons desirous of possessing the same.



**RAILROAD FROM PHILADELPHIA TO YORK, (PENN.)**—We observe by the York papers that a public meeting was called in that borough for Thursday evening, to take measures for procuring the extension of the Philadelphia and Columbia railroad to that place. The Lancaster Examiner in noticing the subject, says, such an extension we have no doubt will be made without much delay.

From other sources we learn that the railroad from Philadelphia to Columbia is expected to be completed and in operation some time during the coming winter. When it shall be extended to York, if not before, it strikes us as constituting a subject that ought to be deemed of some interest to the people of Baltimore. At present, and for many years past, the agricultural products of York county have been taken to the Baltimore market. Will it not be otherwise when the railroad from Philadelphia is completed to York?—unless the Baltimore railroad be also extended to that town? When it was turnpike against turnpike, the Baltimore market had nothing to fear, in regard to the competition for the traffic of this fruitful country; but when we have only a turnpike to oppose to a Railroad, it is such a change of the condition of things as may hazard the loss of a good portion of the traffic. At all events, the subject deserves consideration, to see if there be a remedy.—[Baltimore Patriot.]

**OHIO.**—The Legislature assembled at Columbus 2d inst. Gov. Lucas transmitted his Message on 3d inst. which is long, but confined entirely—as generally speaking such messages should be—to State affairs. The Governor recommends unhesitatingly the establishment of a *State Bank*, with such capital as will be sufficient to supply to the extent which may be found needful, a present admitted deficiency of the circulating medium.

On the subject of the Ohio Canals, in which there is much interest felt in this State and in this city, we extract what the Governor says—

From the Report of the Auditor and Treasurer of State, it will be perceived that the finances of the State are in a prosperous condition. The balance of the different funds that remained in the State Treasury on the 15th November, 1833, as reported by the Auditor, amounted to \$185,193 61 4

The amount of foreign Canal debt	\$4,500,000 00 0
Interest payable annually to foreign Stockholders on \$400,000, at 5 per cent., and on \$4,100,000, at 6 per cent. amounts to	\$266,000 00 0
Amount of loan drawn from the School fund for Canal purposes,	\$504,391 88 7
The interest on which amounting to about	\$33,500 00 0
applicable to the Common School fund.	

The amount of the Canal debt, foreign and domestic, is \$5,064,391 88 7

The amount of Tolls collected on the Ohio Canal for the year ending the 15th of March, 1833, is \$130,026 52 7

The amount of the same on the Miami Canal. 49,946 54 0

Total amount of collections on the Ohio and Miami Canals, 179,973 06 7

Deduct contingent expenses on the Ohio Canal,	\$5,674 63 0
Do. Miami	3,920 00 0
	9,614 63 0

Total amount of Tolls paid into the State Treasury, 170,358 43 7

Amount paid into the Treasury by A. Kelley for water rents and lots sold, 1,981 14 0

Amount paid into the Treasury for the sales of Ohio Canal lands, 115,759 63 0

Total paid into the Treasury from tolls, water rents and sales of Ohio Canal lands, \$288,099 20 7

Thus it appears that the receipts into the Treasury within the last year, for the sales of Ohio Canal lands, water rents and tolls, will pay the interest on the foreign Canal debt, and twenty-two thousand ninety-nine dollars, twenty cents and seven mills over. This sum goes to our citizens, and is added to the school fund. The receipts of tolls next year, it is anticipated, will be sufficient to pay the interest

on the whole Canal debt, and will gradually thereafter accumulate a surplus sufficient in amount if profitably invested, to extinguish the whole Canal debt, by the time it become due.

The amount of money paid into the State Treasury for the sales of the Miami Canal lands, for the year ending the 15th November, 1833, is \$112,207 957

From which deduct the amount paid Canal fund Commissioners, to pay Contractors on the Miami Canal	55,000 00 0
Expenses paid Receivers, Registrars and others,	3,267 87 0
Total amount drawn from the Treasury,	58,297 87 0

Balance remaining in the Treasury, 15th Nov. 1833,	53,940 08 0
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This sum has been received from the sales of those lands that were brought into market, under the provisions of the Act of 21st of December, 1831; and cannot be applied to any other purpose than to the extension of the Miami Canals. Seventeen miles of this Canal north of Dayton were put under contract within the last season, the work on which is progressing, and the sales of the lands continue to be uninterrupted.

There is no part of our State policy that we can contemplate with more satisfaction

**NAVAL LYCEUM.**—We have great pleasure in annexing the names of the officers, &c. of this association, recently formed at this Station by the officers of the Navy and Marine Corps. The objects in view—besides drawing closer the bonds of intercourse and friendship of all engaged in a common service—are to provide a library—a museum or depository, for rare objects of natural history, for the collection of which the diversified service of the Navy in all climates affords so many opportunities—and a reading room, where the best publications, periodical and others, may be seen. We are quite sure the Head of the Navy department should, and do not doubt he will, approve and aid in all that depends upon him, the objects of this association.

*Officers of the "United States Naval Lyceum" established at the Navy Yard New York.*

Com. Charles G. Ridgely,	President.
Captain M. C. Perry,	1st Vice President.
Lieut. Col. John M. Gamble,	2d " "
Tunis Craven Esq.,	3d " "
Lieut. Wm. L. Hudson,	4th " "
Lieut. Henry Pinkney,	
Dr. John Haslett,	Corresponding Sect's.
Henry J. Willett Esq.,	
A. B. Ellison,	Recording Sect's.
George W. Lee,	Treasurer.
Dr. Thomas L. Smith,	Librarian.
Mr. John Bellingham,	Assistant Librarian.
Mr. Samuel M. Pook,	Draftsman.

<b>Executive Committee.</b>	<b>Nominating Committee.</b>
Capt. M. P. Mix,	Capt. S. H. Stringham,
Capt. Wm. Dulany,	Capt. Wm. Dulany,
Lieut. Jno. S. Nicholas,	Lieut. Jno. S. Nicholas,
Lieut. Wm. L. Hudson,	Samuel Hartt, Esq.,
Lieut. Wm. S. Ogden,	Mr. John Robinson.

<b>Library Committee.</b>	<b>Finance Committee.</b>
Capt. Benj. Cooper,	Jas. M. Halsey, Esq.
Dr. John Haslett,	C. O. Handy, Esq.
C. O. Handy, Esq.,	D. Thos. L. Smith.
Lieut. A. A. Nicholson,	
Dr. D. S. Edwards.	

<b>Curators.</b>
Capt. M. C. Perry,
Lieut. James Glynn,
Dr. Wm. Swift,
Dr. Thos. L. Smith,
Dr. D. S. Edwards.

Chevalier F. Tacón had an audience of the President on Wednesday last, and presented his new credentials as Envoy Extraordinary and Minister Plenipotentiary from the Queen Regent of Spain.

**LATER FROM EUROPE.**—The Montreal packet ship from London, brings papers to 8th November from that port. They furnish Paris dates of 5th Nov. and Madrid of 28th Oct. five days later from the last

city than those by the Plato, arrived here from Malaga.

The young Queen, Donna Isabella, was proclaimed on the 24th in Madrid, with great enthusiasm. The Royalist Volunteers, a sort of seditious city militia in that capital, were disarmed on the 27th—not, however, without some bloodshed.

The Madrid Gazette of 24th contains, it is said by a Paris correspondent of the Times, many excellent decrees of unexpected liberality. That which relates to an amnesty of the past, however, is deemed incomplete for its omission of many liberal names of repute, and that of *Mina* in particular. *Francisco Xavire de Burgos*, lately named Minister *del fomento*, is considered as the adviser of these and other measures of reform. The property of Don Carlos, said to be very large, was confiscated by royal decree. We nowhere hear of the appearance of this personage.

The report, via Bordeaux, of 40,000 French troops marching towards the Spanish frontiers, turns out to be without any other foundation than that derived from the military movements incident to change of garrisons in the south of France.

From Portugal there is nothing new.

## LOCOMOTIVE ENGINES.

**THE AMERICAN STEAM CARRIAGE COMPANY, OF PHILADELPHIA,** respectfully inform the public, and especially Railroad and Transportation Companies, that they have become sole proprietors of certain improvements in the construction of Locomotive Engines, and other railway carriages, secured to Col. Stephen H. Long, of the United States Engineers, by letters patent from the United States, and that they are prepared to execute any orders for the construction of Locomotive Engines, Tenders, &c. with which they may be favored, and pledge themselves to a punctual compliance with any engagements they may make in reference to this line of business.

They have already in their possession the requisite apparatus for the construction of three classes of engines, viz. engines weighing four, five, and six tons.

The engines made by them will be warranted to travel at the following rates of speed, viz. a six ton engine at a speed of 15 miles per hour; a five ton engine at a speed of 18 miles per hour; a four ton engine at a speed of 23 1/2 miles per hour. Their performance in other respects will be warranted to equal that of the best English engines of the same class, with respect not only to their efficiency in the conveyance of burthens, but to their durability, and the cheapness and facility of their repairs.

The engines will be adapted to the use of anthracite coal, pine wood, coke, or any other fuel hitherto used in locomotive engines.

The terms shall be quite as favorable, and even more moderate, than those on which engines of the same class can be procured from abroad.

All orders for engines, &c. and other communications in reference to the subject, will be addressed to the subscriber, in the city of Philadelphia, and shall receive prompt attention.

By order of the Company, WILLIAM NORRIS, Secretary.

December 2d, 1833.

For further information on this subject see No. 49, page 772 of this Journal. d6

**TOWNSEND & DUFFEE**, of Palmyra, Steam-factories of Railroad Rope, having removed their establishment to Hudson under the name of *Duffee, May & Co.* offer to supply Rope of any required length (without splice) for inclined planes of Railroads at the shortest notice, and deliver them in any of the principal cities in the United States. As to the quality of Rope, the public are referred to J. B. Jervis, Esq. M. & H. R. R. Co., Albany; or James Archibald, Engineer Hudson and Delaware Canal and Railroad Company, Carbondale, Luzerne county, Pennsylvania.

Hudson, Columbia county, New York, {  
January 29, 1833. F3 if

## PATENT RAILROAD, SHIP AND BOAT SPIKES.

The Troy Iron and Nail Factory keep constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation and now almost universal use in the United States (as well as England, where the subscriber obtained a Patent,) are found superior to any ever offered in market.

Railroad Companies may be supplied with Spikes having countersink heads suitable to the holes in iron rails, to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

All orders directed to the Agent, Troy, N. Y., will be punctually attended to.

HENRY BURDEN, Agent.

Troy, N. Y. July, 1831.

Spikes are kept for sale, at factory prices, by I. & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 223 Water street, New York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad Companies would do well to forward their orders as early as practical, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes.

J33 lam H. BURDEN.